# WATER QUALITY SUMMARY

for the

INLAND LAKES of

GREY and BRUCE COUNTIES

Ontario
Ministry
of the
Environment

ONTARIO MINISTRY OF THE ENVIRONMENT

# Water Quality Summary for the Inland Lakes of Grey and Bruce Counties

Water Resources Assessment Unit
Technical Support
Southwestern Region

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## SUMMARY

The majority of inland lakes contained within the Southwestern Region of the Ministry of the Environment are found in Grey and Bruce counties. These lakes are small, shallow, hardwater lakes that are sensitive, primarily because of their size, to influences that affect their water quality. Little change has been noticed however in the productivity of these lakes as reflected through long-term monitoring of water clarity and phytoplankton from 1972 to 1981. Intermittently, however, their sensitivity has been demonstrated through peaks in phytoplankton growth which have resulted in documented blooms on twenty-five percent of the 28 lakes monitored. In addition, several lakes support extensive growths of rooted plants in the nearshore areas which have been a source of concern to users. Over the period of record, water quality has generally been good enough to support a variety of recreational uses.

## INTRODUCTION

The monitoring of the inland lakes of Grey and Bruce counties began on a regular basis in 1972 with the sampling of two lakes. This quickly increased to eight lakes in 1973 and reached 13 lakes at the time of a 1977 publication[a]. By 1981 the sampling program had increased to include 28 lakes on a regular basis (Table 1).

a "Enrichment Status of Owen Sound Bay, Tobermory Harbour and Thirteen Lakes in Grey and Bruce Counties 1975-1976." Ontario Ministry of the Environment.

Table 1. Inland lakes of Grey and Bruce counties monitored on a regular basis.

| No. | Name | Township, County |
|---|---|---|
| 1 | Arran | Arran Township, Bruce County |
| 2 | Bass | Keppel Township, Grey County |
| 3 | Beattie | Albemarle Township, Bruce County |
| 4 | Bells | Glenelg Township, Grey County |
| 5 | Berford | Albemarle Township, Bruce County |
| 6 | Boat | Amabel Township, Bruce County |
| 7 | Brewster | Osprey Township, Grey County |
| 8 | Britain | Lindsay Township, Bruce County |
| 9 | Cameron | St. Edmunds Township, Bruce County |
| 10 | Chesley | Amabel Township, Bruce County |
| 11 | Cyprus | St. Edmunds Township, Bruce County |
| 12 | Eugenia | Artemesia Township, Grey County |
| 13 | Francis | Keppel Township, Grey County |
| 14 | Gillies | Lindsay Township, Bruce County |
| 15 | Gould | Amabel Township, Bruce County |
| 16 | Irish | Artemesia Township, Grey County |
| 17 | Isaac | Albemarle Township, Bruce County |
| 18 | McCullough | Sullivan Township, Grey County |
| 19 | McGill | Sydenham Township, Grey County |
| 20 | Miller | Lindsay Township, Bruce County |
| 21 | Mountain | Keppel Township, Grey County |
| 22 | Shephard | Keppel Township, Grey County |
| 23 | Shouldice | Lindsay Township, Bruce County |
| 24 | Silver | Amabel Township, Bruce County |
| 25 | Sky | Albemarle Township, Bruce County |
| 26 | Spry | Amabel Township, Bruce County |
| 27 | Wilcox | Artemesia Township, Grey County |
| 28 | Williams | Holland Township, Grey County |

The main emphasis of the program was the monitoring of plant productivity in the lakes over time. Changes in water quality as reflected by changes in plant productivity signal the need for closer examination of a lake. Owing to a general uniformity of results indicating an absence of change in water quality over the ten year sampling period, the long-term monitoring program was temporarily stopped in 1981. It is the intention that lakes will be periodically re-sampled to see if the long-term trend is changing. In addition to the long-term monitoring, field investigations are conducted as the need arises, usually in response to a variety of water quality concerns. The program was conducted through the joint efforts of the North Grey-Sauble Valley Conservation Authorities and the Ontario Ministry of the Environment. The locations of the lakes are shown in Figure 1.

## METHODS

The method used to document long-term water quality involved the surveillance of water clarity and plant (phytoplankton) productivity. Phytoplankton are free-floating microscopic plants (algae) that respond quickly to changes in water quality through changes in types and numbers. To collect phytoplankton it is first necessary to measure the depth of light penetration (water clarity) using a Secchi disc. The disc, having a diameter of 20 centimetres is divided into alternating black and white quadrants and is lowered into the water on a graduated line until the quadrants are no longer distinguishable. This depth is recorded and the disc is raised slowly until the quadrants are just distinguishable. This depth is also recorded and the average of the two readings is the Secchi disc depth (Figure 2). The depth to which light can penetrate in sufficient intensity to stimulate phytoplankton growth (the euphotic zone) is approximately twice the Secchi disc depth.

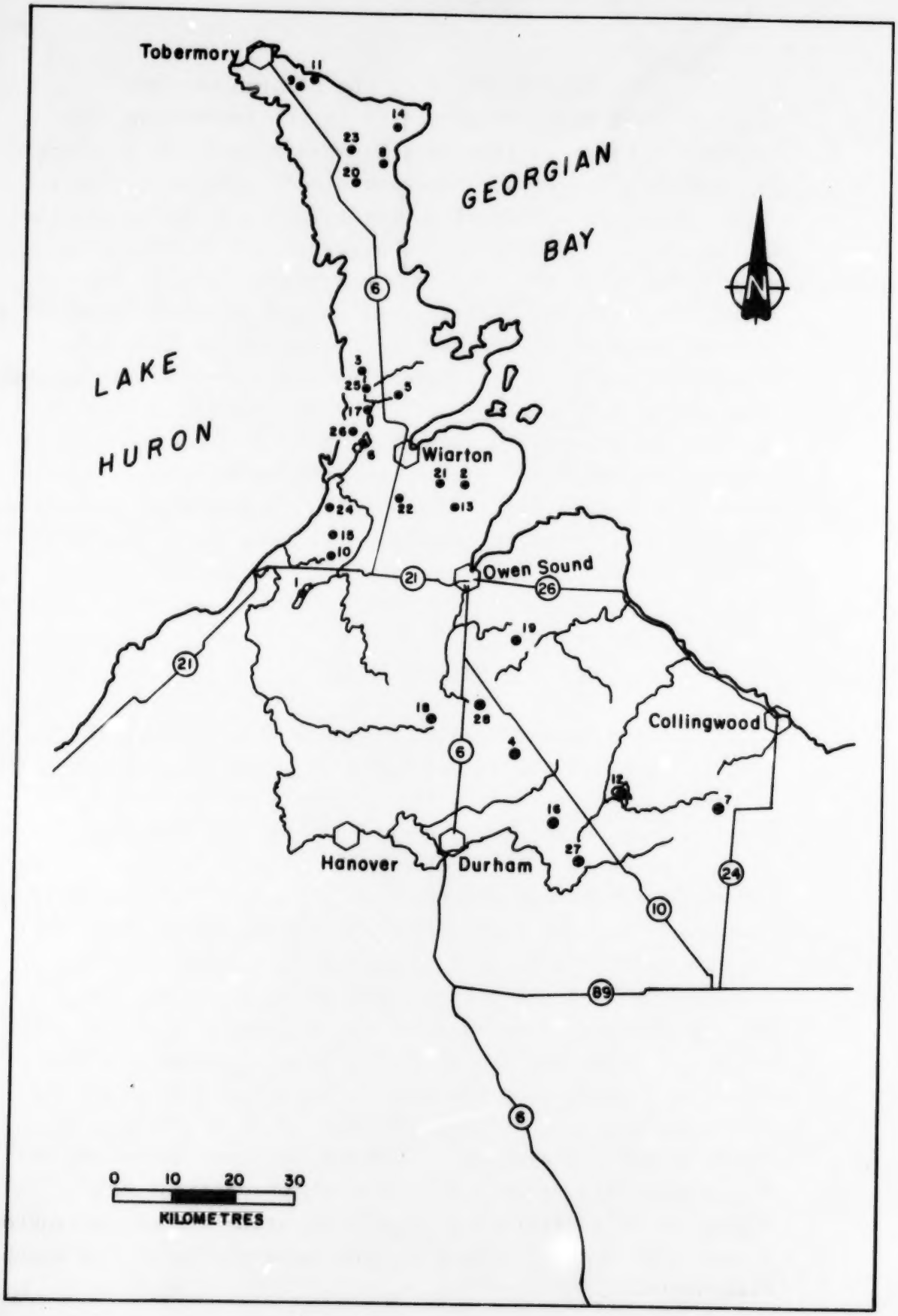



Figure 1. Locations of regularly monitored lakes.

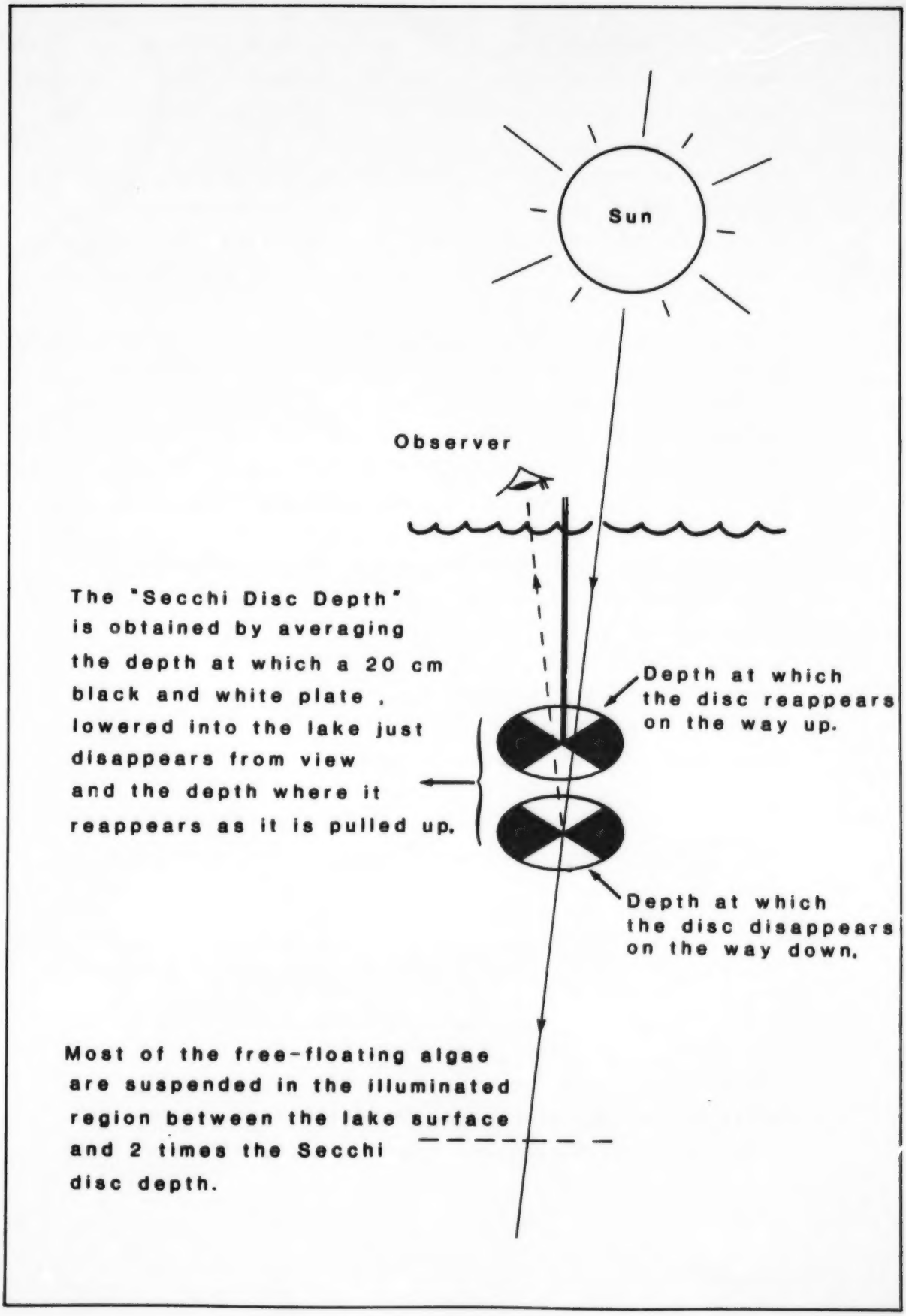

Sun
Observer
The "Secchi Disc Depth" is obtained by averaging the depth at which a 20 cm black and white plate, lowered into the lake just disappears from view and the depth where it reappears as it is pulled up.
Depth at which the disc reappears on the way up.
Depth at which the disc disappears on the way down.
Most of the free-floating algae are suspended in the illuminated region between the lake surface and 2 times the Secchi disc depth.

Figure 2. The use of a Secchi disc to measure water clarity.

Knowing the Secchi disc depth and consequently the depth to which algae can live (the euphotic zone), samples were collected through this zone. Samples collected for chlorophyll a analysis (1972 to 1981) were preserved with 1 ml of 0.5% magnesium carbonate while samples collected for phytoplankton analysis (1977 to 1981) were preserved with Lugols iodine (7 drops). All analyses were carried out at the Toronto laboratory of the Ministry of the Environment.

In addition to measuring water clarity and plant productivity, lake water chemistry was also analysed. Oxygen and temperature readings were obtained from just below the surface and from just off the bottom at the deepest spot in a lake using a Hach kit. If a lake contained more than one basin then oxygen and temperature were evaluated in each basin. If it was determined that thermal stratification was occurring then an oxygen-temperature profile was completed and a water sample was collected for chemical analysis from both the top and bottom waters. If a lake was homothermous then a single water sample was collected at mid-depth in the lake basin(s). Samples for chemical analysis were collected over the three-year period from 1977 to 1979 to establish baseline water chemistry.

All of the aforementioned samplings were conducted approximately every two weeks from May through August.

## RESULTS AND CONCLUSIONS

Results for annual average chlorophyll a concentrations - Secchi disc depths and phytoplankton cell volumes are listed in tables 2 and 3 respectively. In addition, graphs displaying chlorophyll a - Secchi disc relationships, histograms displaying phytoplankton cell

TABLE 2. Annual average chlorophyll a - Secchi disc results for 1978 to 1981.

| LAKE | 1978 | | 1979 | | 1980 | | 1981 | |
|---|---|---|---|---|---|---|---|---|
| | Chl.a (ug/l) | Secchi depth (m) | Chl.a (ug/l) | Secchi depth (m) | Chl.a (ug/l) | Secchi depth (m) | Chl.a (ug/l) | Secchi depth (m) |
| 1) Arran | 2.0 | 2.2 | 1.8 | 2.2 | 2.5 | 1.8 | 1.7 | 3.0 |
| 2) Bass | 1.3 | 2.4 | 2.0 | 2.1 | 1.3 | 3.6 | 1.2 | 3.0 |
| 3) Beattie | 1.6 | 1.7 | 1.1 | 1.5 | 1.4 | 1.5 | 2.4 | 2.0 |
| 4) Bells | 1.3 | 4.1 | 1.9 | 3.5 | 1.9 | 3.1 | 1.6 | 3.3 |
| 5) Berford | 1.7 | 3.5 | 2.0 | 3.3 | 1.5 | 4.4 | 1.7 | 3.0 |
| 6) Boat | 1.7 | 2.0 | 1.9 | 1.8 | 2.2 | 1.5 | 2.1 | 1.7 |
| 7) Brewster | 1.4 | 6.3 | 1.7 | 6.0 | 1.6 | 6.1 | 1.9 | 4.0 |
| 8) Britain | 1.3 | 2.1 | 2.4 | 2.1 | 2.6 | 2.2 | 2.2 | 2.0 |
| 9) Cameron | 1.2 | 3.1 | 1.8 | 2.1 | 1.2 | 3.3 | 1.4 | 2.3 |
| 10) Chesley | 3.7 | 2.3 | 2.4 | 3.7 | 2.8 | 4.1 | 1.8 | 2.9 |
| 11) Cyprus | 2.1 | 2.9 | 1.6 | 2.0 | 1.4 | 2.4 | 1.3 | 2.1 |
| 12) Eugenia | 2.6 | 4.0 | 2.3 | 3.4 | 2.6 | 4.2 | 2.6 | 3.0 |
| 13) Francis | 0.5 | 2.4 | 1.2 | 2.6 | 1.4 | 3.3 | 1.5 | 2.4 |
| 14) Gillies | 0.9 | 5.6 | 1.0 | 4.6 | 1.0 | 6.9 | 0.9 | 5.4 |
| 15) Gould | 2.4 | 3.5 | 2.8 | 2.7 | 2.3 | 3.4 | 2.2 | 2.7 |
| 16) Irish | -- | -- | 1.5 | 3.4 | 2.6 | 4.9 | 2.5 | 2.9 |
| 17) Issac | 1.7 | 1.6 | 1.4 | 1.5 | 1.8 | 1.2 | 2.1 | 1.7 |
| 18) McCullough | 1.3 | 4.0 | 1.8 | 3.6 | 1.5 | 4.4 | 1.7 | 3.6 |
| 19) McGill | -- | -- | 2.7 | 2.1 | 3.7 | 3.1 | 2.6 | 2.4 |
| 20) Miller | 2.3 | 2.9 | 2.5 | 1.8 | 2.1 | 2.7 | 2.0 | 2.4 |
| 21) Mountain | 1.3 | 1.7 | 1.9 | 1.7 | 2.5 | 1.6 | 1.5 | 1.7 |
| 22) Shephard | -- | -- | 0.7 | 4.8 | 1.6 | 1.4 | 2.1 | 1.6 |
| 23) Shouldice | 0.9 | 2.2 | 3.7 | 1.7 | 1.0 | 2.0 | 1.1 | 2.3 |
| 24) Silver | 1.1 | 1.7 | 1.9 | 1.5 | 1.5 | 1.2 | 1.3 | 1.6 |
| 25) Sky | 1.8 | 1.6 | 1.8 | 1.7 | 1.8 | 1.7 | 1.5 | 1.5 |
| 26) Spry | 2.5 | 1.8 | 2.8 | 2.4 | 2.2 | 2.1 | 1.7 | 1.9 |
| 27) Wilcox | 2.9 | 4.0 | 2.5 | 2.9 | 3.1 | 3.6 | 3.2 | 2.3 |
| 28) Williams | -- | -- | 1.1 | 1.9 | 0.7 | 3.8 | 0.6 | 3.0 |

TABLE 3. Annual average phytoplankton results for 1977 to 1981.

| LAKE | CELL VOLUME $mm^3/l$ | | | | |
|---|---|---|---|---|---|
| | 1977 | 1978 | 1979 | 1980 | 1981 |
| 1) Arran | .708 | 1.293 | 1.003 | 1.080 | .375 |
| 2) Bass | .299 | .809 | .367 | .958 | .037 |
| 3) Beattie | .790 | .679 | .332 | .589 | .434 |
| 4) Bells | -- | .690 | .476 | .509 | .240 |
| 5) Berford | .950 | .927 | .850 | .518 | .739 |
| 6) Boat | .178 | 1.455 | .794 | .530 | .433 |
| 7) Brewster | -- | .478 | .661 | .680 | .447 |
| 8) Britain | -- | -- | .675 | .944 | .327 |
| 9) Cameron | .495 | .604 | .880 | .640 | .408 |
| 10) Chesley | .612 | 1.976 | .675 | .772 | .239 |
| 11) Cyprus | .550 | 1.207 | .667 | .997 | .121 |
| 12) Eugenia | .227 | .827 | .934 | 1.905 | .363 |
| 13) Francis | -- | .458 | .427 | 1.491 | .269 |
| 14) Gillies | .216 | .465 | .202 | .308 | .114 |
| 15) Gould | .391 | 1.368 | 1.405 | 1.258 | .483 |
| 16) Irish | .631 | -- | .381 | .753 | .522 |
| 17) Issac | .309 | .574 | .230 | .219 | .094 |
| 18) McCullough | .501 | .487 | .542 | .390 | .250 |
| 19) McGill | -- | -- | .378 | .897 | .178 |
| 20) Miller | .592 | 4.153 | 1.066 | 2.276 | .569 |
| 21) Mountain | -- | 2.471 | .567 | 1.062 | .390 |
| 22) Shephard | -- | -- | -- | 1.099 | .257 |
| 23) Shouldice | .681 | .681 | 1.687 | .376 | .189 |
| 24) Silver | .265 | .632 | .725 | .419 | .107 |
| 25) Sky | .285 | .459 | .519 | .586 | .136 |
| 26) Spry | .620 | .939 | .695 | 1.194 | .329 |
| 27) Wilcox | -- | 1.073 | 1.120 | 1.436 | .296 |
| 28) Williams | .075 | .226 | .140 | .171 | .085 |

volumes and tables showing water chemistry are summarized for each of the 28 lakes in the Appendix. Chlorophyll a data for 1977 has been deleted because of analytical uncertainty.

The chlorophyll a - Secchi disc curves indicate that the lakes were relatively unproductive with regard to phytoplankton. To illustrate this, data points are individually displayed for each lake in relation to a curve which was derived from data collected from more productive lakes in the Kawartha Lakes district. The majority of lakes in Grey and Bruce counties had an annual average chlorophyll a concentration between 1 and 2.5 ug/l. Britain, Eugenia, Gould, Irish, and Spry lakes had annual averages which ranged as high as 2.6 to 3 ug/l, while Chesley, McGill, Shouldice and Wilcox lakes had averages between 3 and 4 ug/l.

Similarly, the phytoplankton cell volumes were also very low. As a general rule, the following categories may be applied to interpret phytoplankton cell volumes.

| Cell Volume ($mm^3/l$) | Degree of Productivity |
|---|---|
| L1 | low |
| 1-3 | moderate |
| G3 | high |

L = Less Than
G = Greater Than

During 1977 and 1981, no lake exceeded an average annual cell volume of 1 $mm^3/l$, thus indicating years of moderate productivity. For the years from 1978 to 1980, Arran, Gould Miller and Wilcox lakes had volumes consistently above 1 $mm^3/l$. Sixteen of the remaining 24 lakes remained less than 1 $mm^3/l$ and the other 8 had yearly

fluctuations above 1 $mm^3/l$, indicating years of moderate productivity. Miller lake was the only lake that had a high degree of productivity (4.153 $mm^3/l$) which occurred during the summer of 1978.

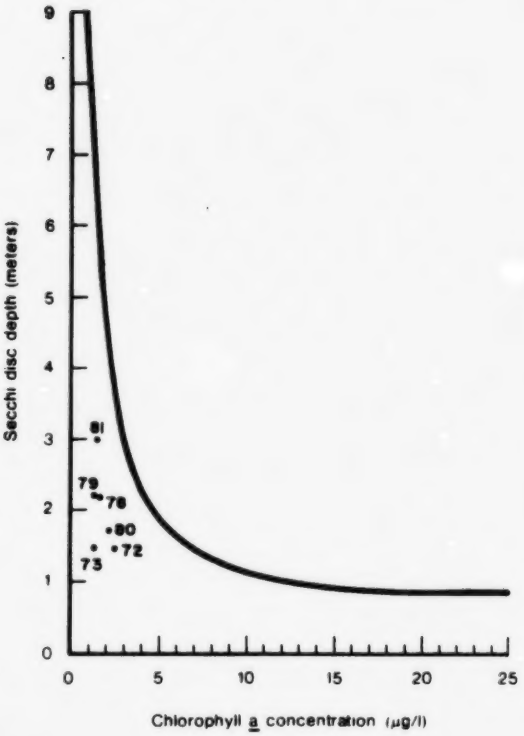
Despite low annual averages, which reflect a generally acceptable level of productivity, peaks in productivity called "blooms" can occur. Known blooms have occurred in Berford, Chesley, Bass, Eugenia, Gould, Miller and Wilcox lakes.

Because of the physical nature of the lakes, much of the plant productivity is in plant forms other than phytoplankton. Typically these other types of plants are rooted plants, diatom scums and/or beds of the alga, Chara. Heavy growths of rooted plants in the nearshore areas have been a source of particular concern to users of Eugenia, Wilcox and Chesley lakes.

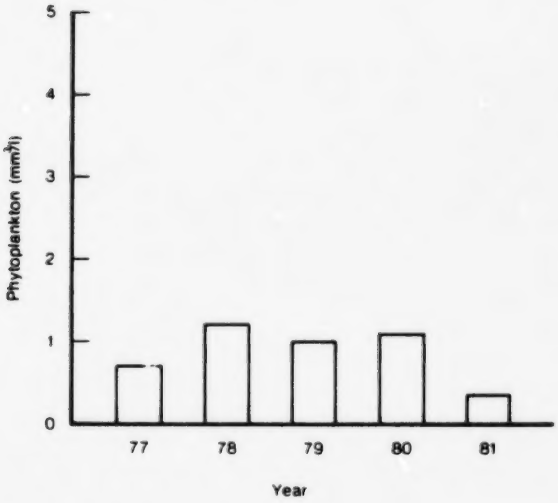
The water chemistry data show the lakes to be hardwater lakes with high alkalinities, which reflects their location in the calcareous bedrock of the Niagara Escarpment. Most of the hardness is in the form of calcium carbonate which encrusts the aquatic plants and deposits on the bottom as marl. In general, the hardness ranges between 100 and 200 mg/l (as $CaCO_3$). Several lakes, Bass, Bells, Eugenia, McCullough, Shephard and Williams, have a hardness in excess of 200 mg/l. Phosphorus concentrations were generally quite low over the period of measurement from May through August. Enough phosphorus is present however to support aquatic plant growth and along with ammonia showed a tendency in some stratified lakes to be higher in bottom waters. An increase of ammonia and phosphorus can be indicative of deteriorating water quality however no obvious relationship was demonstrated for these lakes.

# APPENDIX

## 1. ARRAN LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

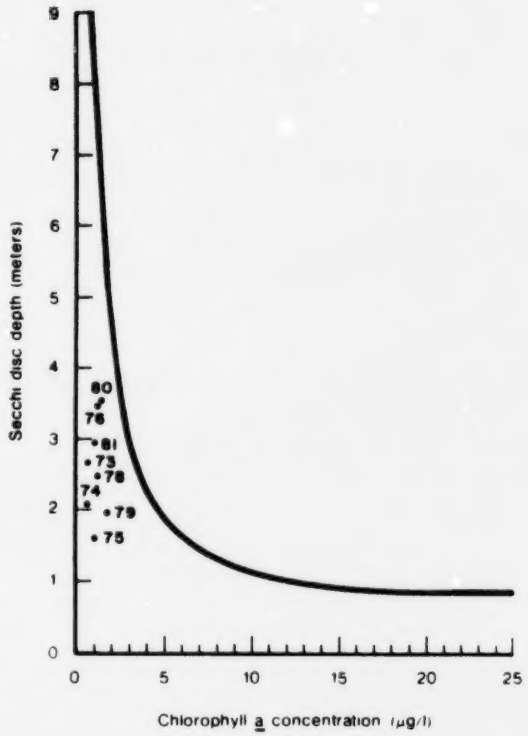
| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume ($mm^3/l$) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 | 0.8 | -- | 0.708 | 0.014 | 0.003 | 3.9 | 140 |
| 1978 | 2.2 | 2.0 | 1.293 | 0.015 | 0.004 | 4.0 | 151 |
| 1979 | 2.2 | 1.8 | 1.003 | 0.011 | 0.002 | 4.2 | 139 |

| Year | Nitrogens: Free ammonia | Nitrogens: Kjeldahl | Nitrogens: Nitrite | Nitrogens: Nitrate | pH (no units) | Solids: Total | Solids: Suspended |
|---|---|---|---|---|---|---|---|
| 1977 | 0.039 | 0.552 | 0.003 | 0.02 | 8.45 | -- | -- |
| 1978 | 0.039 | 0.528 | 0.002 | <0.01 | 8.45 | 178 | 2.7 |
| 1979 | 0.033 | 0.510 | 0.001 | <0.01 | 8.50 | 162 | 5.0 |

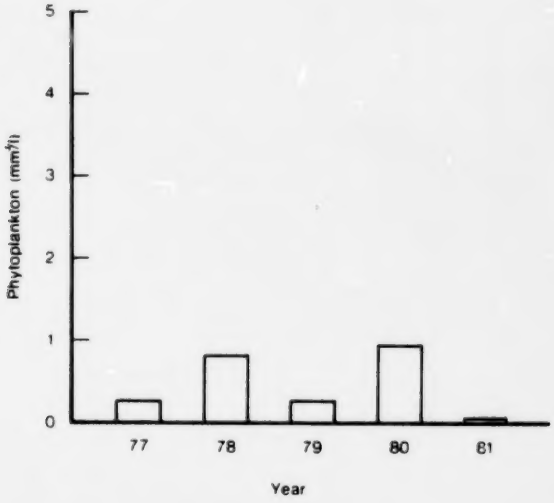
| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 | 113 | -- | 0.052 | -- | -- | -- |
| 1978 | 147 | 1.02 | 0.05 | 38.5 | 2.2 | 14.0 |
| 1979 | 126 | -- | 0.11 | 31.5 | 2.3 | 14.7 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 2. BASS LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

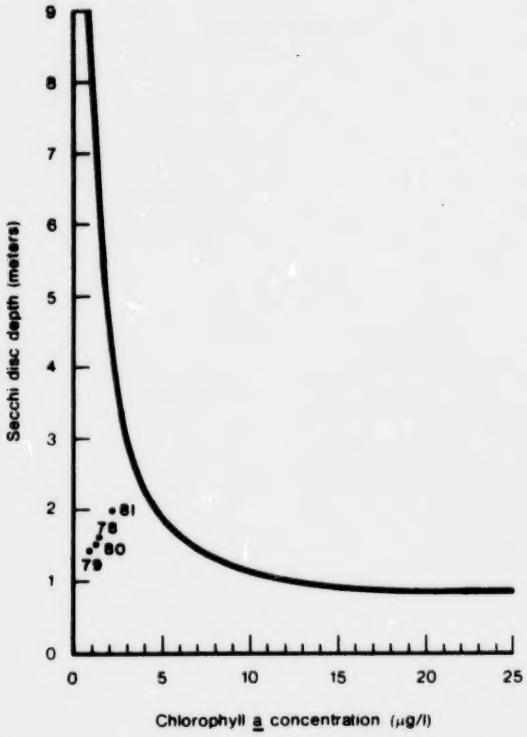
| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 T | 3.4 | -- | 0.299 | 0.007 | 0.001 | 2.86 | 188.3 |
| B | | | | 0.084 | 0.006 | 9.27 | 238.5 |
| 1978 T | 2.4 | 1.5 | 0.809 | 0.010 | 0.002 | 2.6 | 205 |
| B | | | | 0.062 | 0.004 | 4.0 | 197 |
| 1979 T | 2.1 | 2.0 | 0.367 | 0.007 | 0.001 | 3.1 | 178 |
| B | | | | 0.041 | 0.009 | 3.8 | 208 |

| Year | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|
| 1977 T | 0.015 | 0.4168 | 0.002 | 0.021 | 8.37 | -- | -- |
| B | 1.52 | 2.37 | 0.006 | 0.019 | 7.55 | | |
| 1978 T | 0.02 | 0.29 | 0.75 | 0.43 | 8.29 | 204 | 1.0 |
| B | 0.468 | 1.09 | 0.006 | 0.28 | 7.92 | | |
| 1979 T | 0.011 | 0.25 | 0.002 | 0.07 | 8.48 | 202 | 5.0 |
| B | 0.615 | 1.1 | 0.007 | 0.08 | 7.77 | 234 | 6.6 |

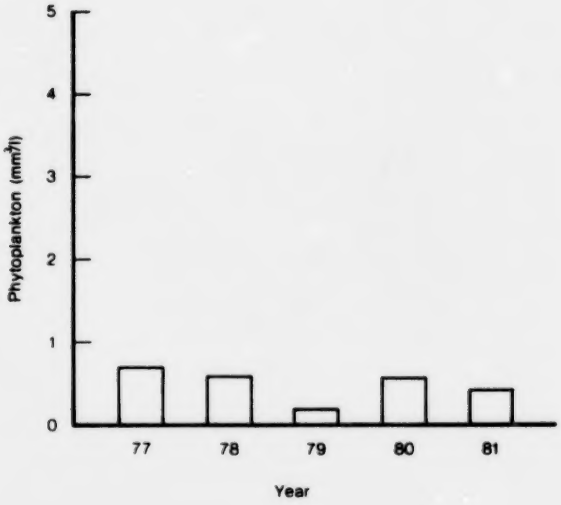
| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 T | 174.3 | -- | 0.028 | -- | -- | -- |
| B | 235.2 | | 0.175 | | | |
| 1978 T | 193 | 2.73 | 0.034 | 42.5 | 1.3 | 23.9 |
| B | 194 | 3.17 | 0.24 | 42.8 | 2.5 | 20.0 |
| 1979 T | 170 | -- | 0.03 | 34.8 | 1.6 | 24.4 |
| B | 200 | | 0.12 | 45.7 | 1.8 | 24.9 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 3. BEATTIE LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

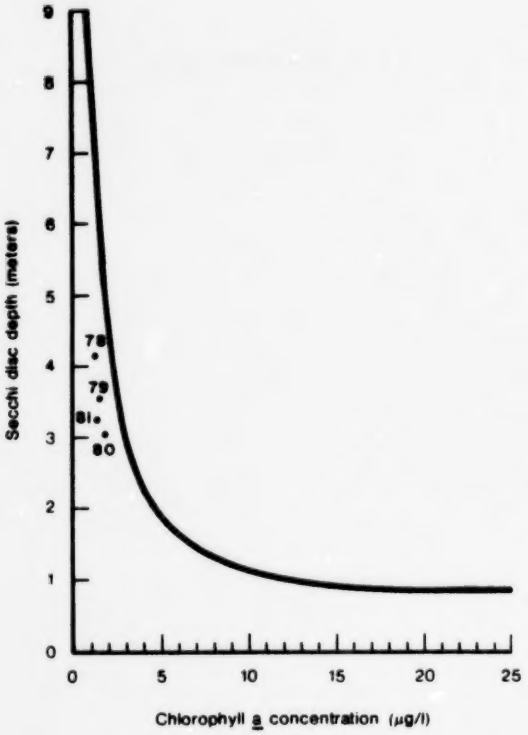
| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume ($mm^3/l$) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 | -- | -- | 0.780 | -- | -- | -- | -- |
| 1978 | 1.7 | 1.6 | 0.679 | 0.012 | 0.003 | 1.6 | 151 |
| 1979 | 1.5 | 1.1 | 0.332 | 0.016 | 0.001 | 2.3 | 145 |

| Year | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|
| 1977 | -- | -- | -- | -- | -- | -- | -- |
| 1978 | 0.033 | 0.538 | 0.003 | 0.015 | -- | 167 | 3.5 |
| 1979 | 0.034 | 0.52 | 0.001 | 0.03 | 8.58 | 167 | < 5.0 |

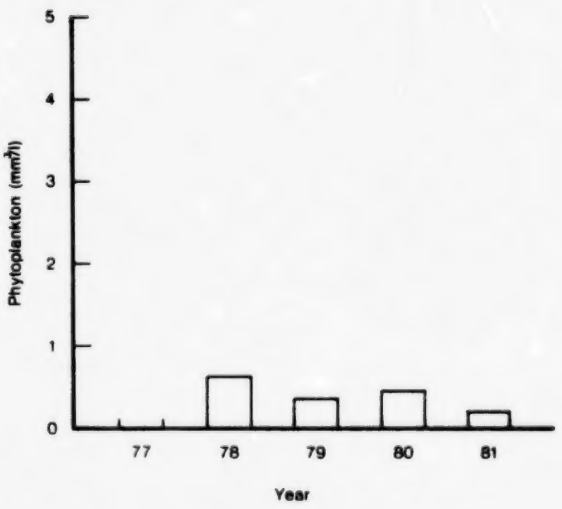
| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 | -- | -- | -- | -- | -- | -- |
| 1978 | -- | 0.7 | 0.04 | 33.8 | 0.73 | 17.2 |
| 1979 | 127 | -- | 0.08 | 26.8 | 0.7 | 19.0 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 4. BELLS LAKE




**Chlorophyll a–Secchi disc curve.**




**Phytoplankton cell volumes.**

Average values for water quality parameters

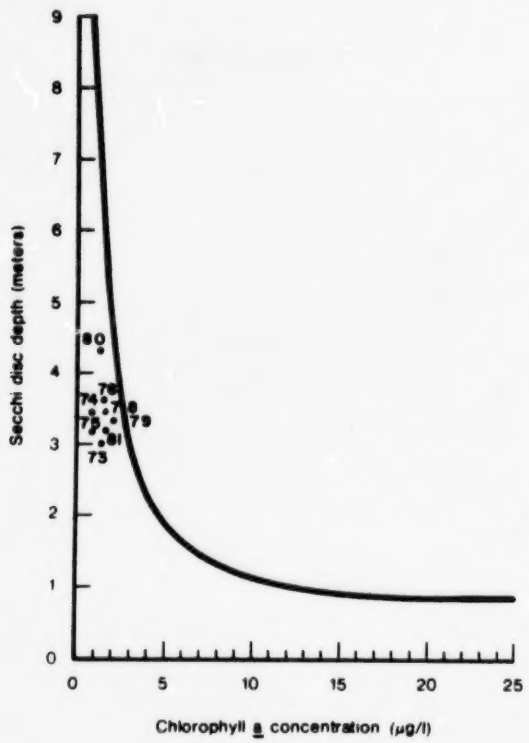
| Year | | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1978 | T | 4.1 | 1.4 | 0.690 | 0.004 | 0.001 | 5.2 | 213 |
| | B | | | | 0.007 | 0.001 | 4.6 | 216 |
| 1979 | T | 3.5 | 2.0 | 0.476 | 0.010 | 0.002 | 6.0 | 215 |
| | B | | | | 0.012 | 0.003 | 5.2 | 219 |

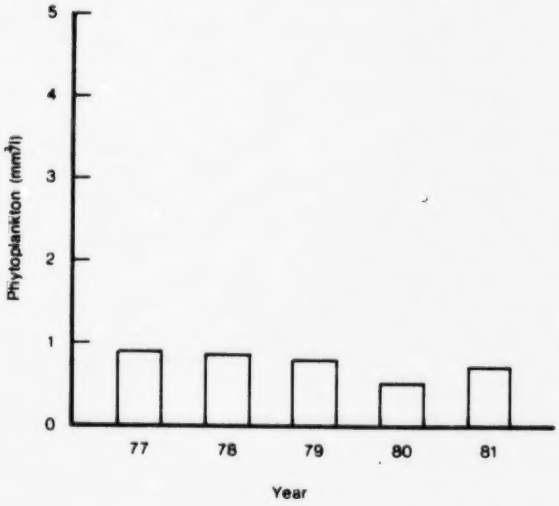
| Year | | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Solids: Suspended |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1978 | T | 0.038 | 0.353 | 0.004 | 0.008 | 8.32 | 214 | 2.1 |
| | B | 0.046 | 0.388 | 0.004 | 0.009 | 8.25 | | |
| 1979 | T | 0.024 | 0.37 | 0.002 | 0.03 | 8.38 | 246 | <5.0 |
| | B | 0.119 | 0.44 | 0.002 | 0.04 | 8.05 | 241 | <5.0 |

| Year | | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|---|
| 1977 | T | -- | -- | -- | -- | -- | -- |
| | B | | | | | | |
| 1978 | T | 205 | 0.66 | 0.04 | 46.8 | 2.9 | 23.2 |
| | B | 203 | 0.72 | 0.05 | 48.1 | 2.8 | 23.1 |
| 1979 | T | 199 | -- | 0.07 | 44.4 | 3.5 | 25.3 |
| | B | 202 | | 0.05 | 46.5 | 3.1 | 24.9 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 5. BERFORD LAKE




Average values for water quality parameters

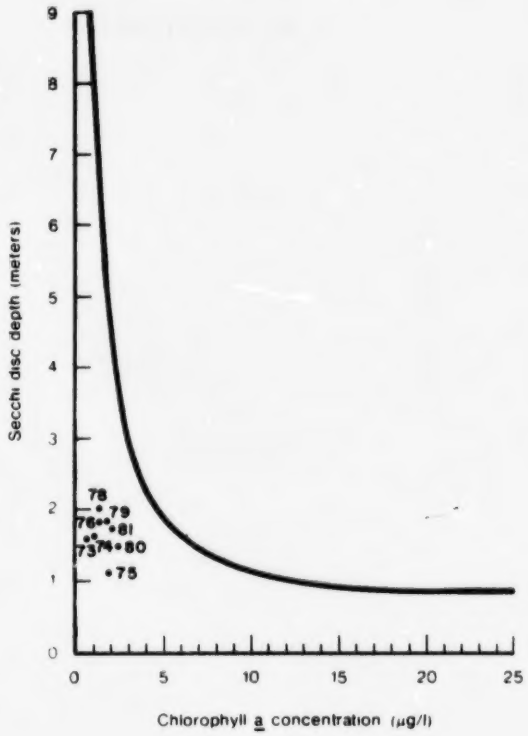
| Year | | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 3.7 | -- | 0.950 | 0.010 | 0.002 | 2.39 | 141.8 |
| | B | | | | 0.010 | 0.002 | 2.36 | 143.6 |
| 1978 | T | 3.5 | 1.7 | 0.927 | 0.005 | 0.002 | 2.3 | 164.3 |
| | B | | | | 0.006 | 0.002 | 2.3 | 164.3 |
| 1979 | T | 3.3 | 2.0 | 0.850 | 0.010 | 0.001 | 2.3 | 143 |
| | B | | | | 0.009 | 0.001 | 2.2 | 144 |

| Year | | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Solids: Suspended |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 0.036 | 0.567 | 0.001 | 0.013 | 8.49 | -- | -- |
| | B | 0.036 | 0.615 | 0.001 | 0.011 | 8.52 | | |
| 1978 | T | 0.04 | 0.494 | 0.002 | 0.02 | 8.39 | 153 | 0.5 |
| | B | 0.04 | 0.511 | 0.002 | 0.02 | 8.41 | 159 | 0.5 |
| 1979 | T | 0.022 | 0.464 | 0.001 | <0.01 | 8.60 | 169 | <5.0 |
| | B | 0.027 | 0.484 | 0.001 | <0.01 | 8.61 | 170 | <5.0 |

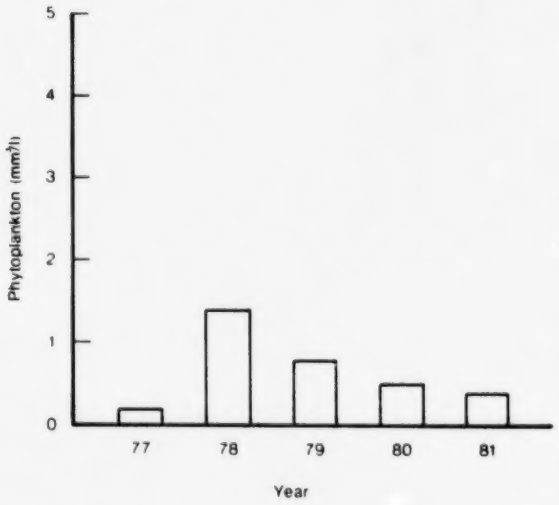
| Year | | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|---|
| 1977 | T | 123.5 | -- | 0.036 | -- | -- | -- |
| | B | 123.7 | | 0.063 | | | |
| 1978 | T | 158 | 0.90 | 0.06 | 38.0 | 0.8 | 16.8 |
| | B | 156 | 1.30 | 0.05 | 38.0 | 0.8 | 16.8 |
| 1979 | T | 129 | -- | 0.03 | 28.7 | 0.9 | 17.4 |
| | B | 129 | | 0.03 | 28.8 | 0.9 | 17.5 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 6. BOAT LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

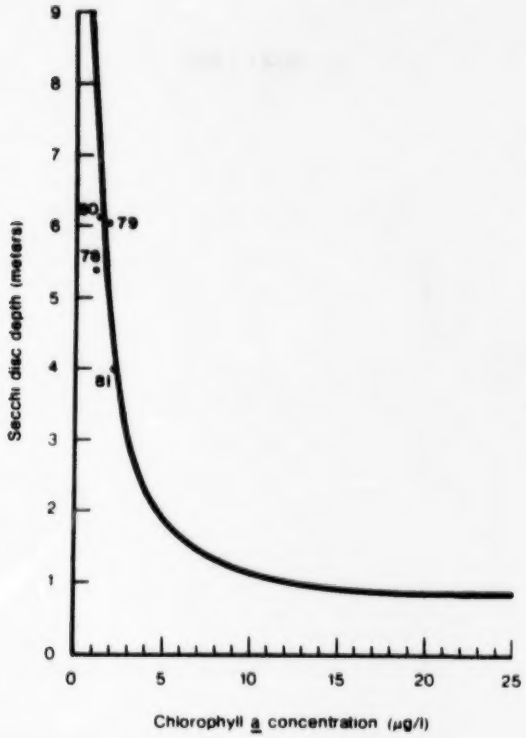
| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume ($mm^3/l$) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 | 1.1 | -- | 0.178 | 0.012 | 0.002 | 3.75 | 155.3 |
| 1978 | 2.0 | 1.7 | 1.455 | 0.009 | 0.002 | 1.5 | 164 |
| 1979 | 1.8 | 1.9 | 0.794 | 0.017 | 0.001 | 4.3 | 174 |

| Year | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|
| 1977 | 0.021 | 0.473 | 0.003 | 0.01 | 8.47 | -- | -- |
| 1978 | 0.029 | 0.489 | 0.001 | 0.01 | 8.29 | 394 | 3.8 |
| 1979 | 0.028 | 0.53 | 0.001 | < 0.01 | 8.48 | 199 | < 5.0 |

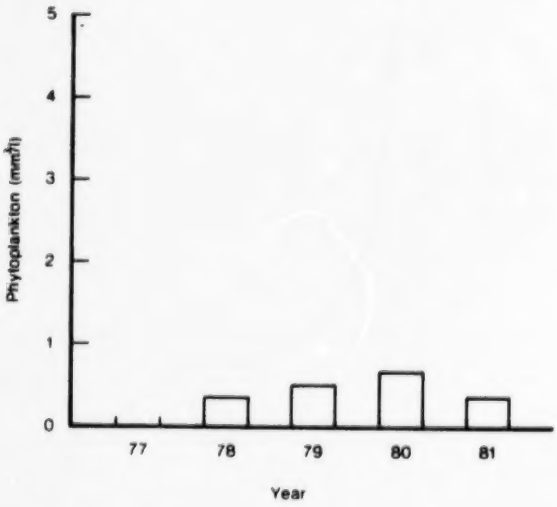
| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 | 146.5 | -- | 0.058 | -- | -- | -- |
| 1978 | 155 | 0.95 | 0.08 | 39.0 | 1.6 | 16.1 |
| 1979 | 158 | -- | 0.06 | 37.2 | 2.1 | 19.6 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 7. BREWSTER LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

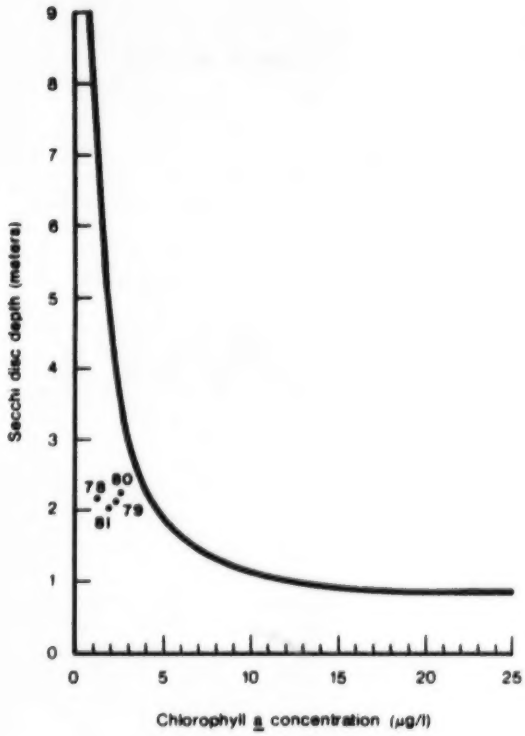
| Year | | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1978 | T | 5.4 | 1.2 | 0.478 | 0.006 | 0.002 | 2.3 | 152 |
| | B | | | | 0.008 | 0.001 | 2.1 | 151 |
| 1979 | T | 6.0 | 1.6 | 0.661 | 0.007 | 0.002 | 2.9 | 185 |
| | B | | | | 0.010 | 0.001 | 2.5 | 197 |

| Year | | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Solids: Suspended |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1978 | T | 0.063 | 0.374 | 0.048 | 0.29 | 8.35 | 159 | 2.0 |
| | B | 0.119 | 0.444 | 0.049 | 0.26 | 8.39 | 180 | 2.0 |
| 1979 | T | 0.059 | 0.437 | 0.007 | 0.14 | 8.45 | 194 | <5.0 |
| | B | 0.332 | 0.658 | 0.010 | 0.08 | 7.98 | 171 | <5.0 |

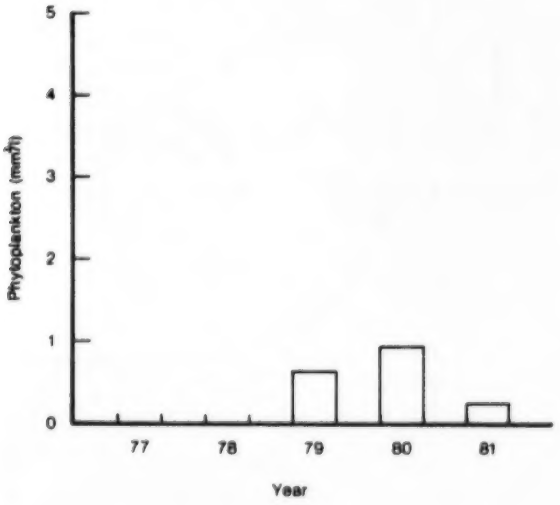
| Year | | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|---|
| 1977 | T | -- | -- | -- | -- | -- | -- |
| | B | | | | | | |
| 1978 | T | 136 | 0.52 | 0.04 | 36 | 0.9 | 15.0 |
| | B | 137 | 0.77 | 0.06 | 35 | 0.9 | 15.3 |
| 1979 | T | 143 | -- | 0.02 | 44.6 | 1.1 | 17.7 |
| | B | 148 | | 0.07 | 48.4 | 1.0 | 18.3 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 8. BRITAIN LAKE




**Chlorophyll a–Secchi disc curve.**




**Phytoplankton cell volumes.**

Average values for water quality parameters

| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume ($mm^3/l$) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 | -- | -- | -- | -- | -- | -- | -- |
| 1978 | 2.1 | 1.3 | -- | 0.010 | 0.001 | 1.0 | 10 |
| 1979 | 2.1 | 2.4 | 0.675 | 0.010 | 0.002 | 1.0 | 139 |

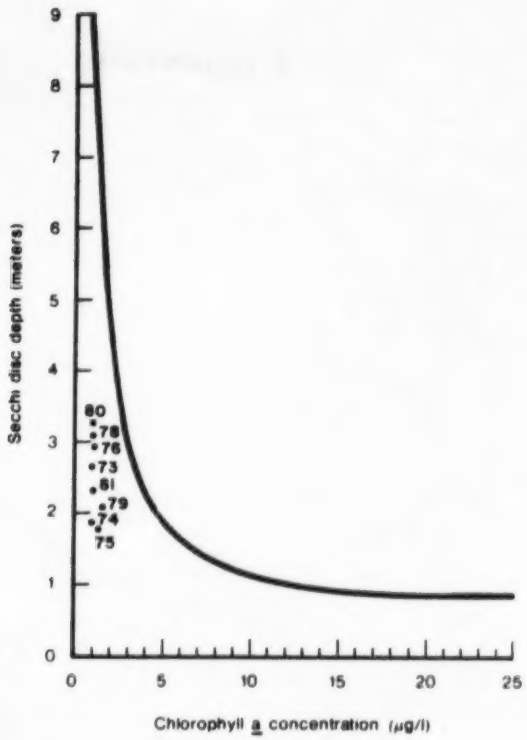
| Year | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|
| 1977 | -- | -- | -- | -- | -- | -- | -- |
| 1978 | 0.045 | 0.39 | 0.001 | < 0.01 | 9.2 | -- | -- |
| 1979 | 0.035 | 0.46 | 0.001 | 0.01 | 8.46 | 157 | < 5.0 |

| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 | -- | -- | -- | -- | -- | -- |
| 1978 | 8.0 | 1.1 | 0.05 | -- | -- | -- |
| 1979 | 124 | -- | 0.08 | 30.6 | 0.4 | 15.3 |

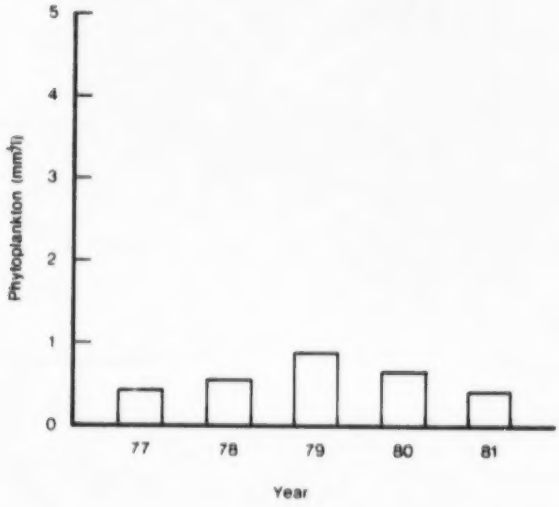
*Note - All values in mg/l except where otherwise indicated

**Formazin Turbidity Units

## 9. CAMERON LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

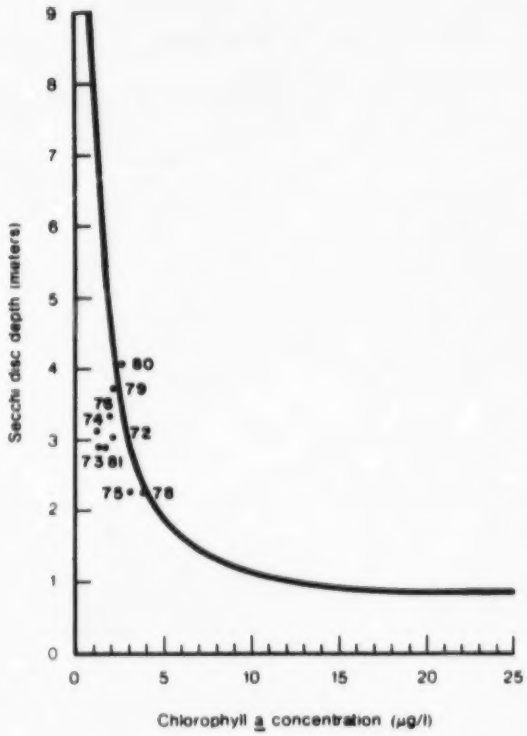
| Year | | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 2.5 | -- | 0.495 | 0.007 | 0.002 | 1.4 | 178.6 |
| | B | | | | 0.015 | 0.002 | 1.2 | 181.1 |
| 1978 | T | 3.1 | 1.2 | 0.604 | 0.007 | 0.001 | 1.6 | 212 |
| | B | | | | 0.016 | 0.002 | 1.5 | 188 |
| 1979 | T | 2.1 | 1.8 | 0.880 | 0.006 | 0.001 | 1.8 | 187 |
| | B | | | | 0.007 | 0.002 | 1.8 | 187 |

| Year | | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Solids: Suspended |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 0.019 | 0.402 | 0.002 | 0.076 | 8.39 | -- | -- |
| | B | 0.122 | 0.593 | 0.002 | 0.086 | 8.11 | | |
| 1978 | T | 0.017 | 0.303 | 0.003 | 0.03 | 8.61 | 214 | 2.5 |
| | B | 0.071 | 0.475 | 0.005 | 0.05 | 8.62 | | |
| 1979 | T | 0.014 | 0.30 | 0.001 | 0.013 | 8.45 | 207 | 5.0 |
| | B | 0.068 | 0.39 | 0.002 | 0.016 | 8.26 | 205 | 5.0 |

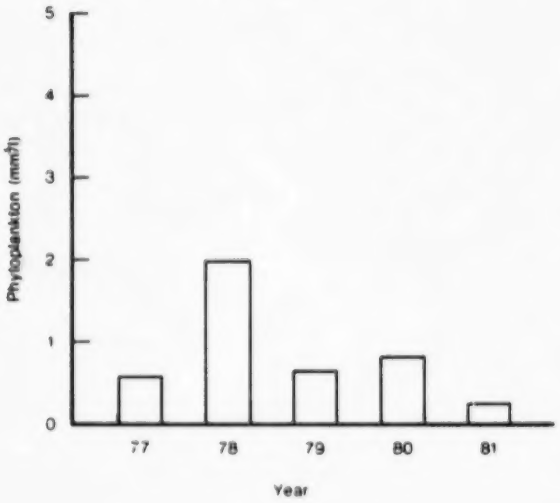
| Year | | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|---|
| 1977 | T | 161.6 | -- | 0.039 | -- | -- | -- |
| | B | 166.4 | | 0.121 | | | |
| 1978 | T | 165 | 1.5 | 0.15 | 49.6 | 9.6 | 19.1 |
| | B | 166 | 4.0 | 0.07 | 40.0 | 0.5 | 21.7 |
| 1979 | T | 167 | -- | 0.04 | 39.0 | 0.6 | 21.8 |
| | B | 168 | | 0.08 | 39.5 | 0.7 | 21.3 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 10. CHESLEY LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

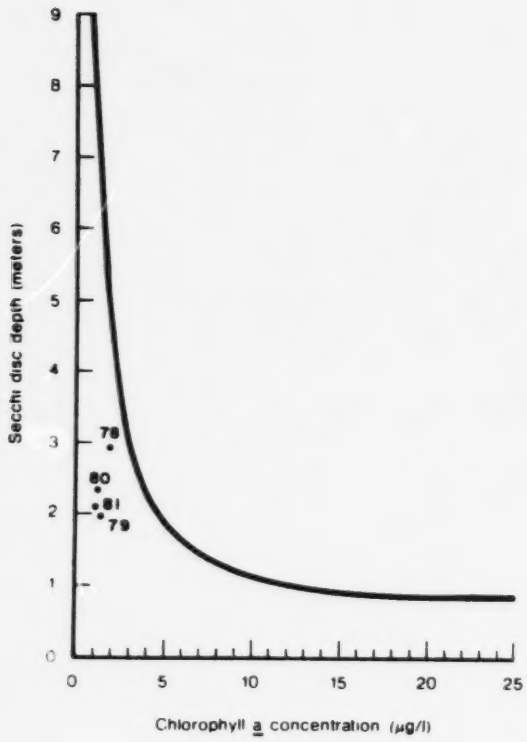
| Year | | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 3.4 | -- | 0.612 | 0.013 | 0.002 | 6.02 | 135.1 |
| | B | | | | 0.038 | 0.006 | 6.06 | 151.7 |
| 1978 | T | 2.3 | 3.7 | 1.976 | 0.016 | 0.004 | 5.3 | 150.6 |
| | B | | | | 0.033 | 0.04 | 5.3 | 152.8 |
| 1979 | T | 3.7 | 2.4 | 0.675 | 0.012 | 0.003 | 5.3 | 144 |
| | B | | | | 0.055 | 0.014 | 5.4 | 161 |

| Year | | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Solids: Suspended |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 0.016 | 0.469 | 0.001 | 0.021 | 8.37 | | |
| | B | 0.353 | 0.818 | 0.003 | 0.026 | 7.61 | -- | -- |
| 1978 | T | 0.016 | 0.75 | 0.001 | < 0.01 | 8.50 | 180 | 2.25 |
| | B | 0.129 | 0.656 | 0.002 | < 0.01 | 8.48 | 186 | 2.25 |
| 1979 | T | 0.024 | 0.38 | 0.001 | 0.01 | 8.27 | 169 | < 5.0 |
| | B | 0.369 | 0.76 | 0.002 | 0.01 | 7.57 | 192 | 4.9 |

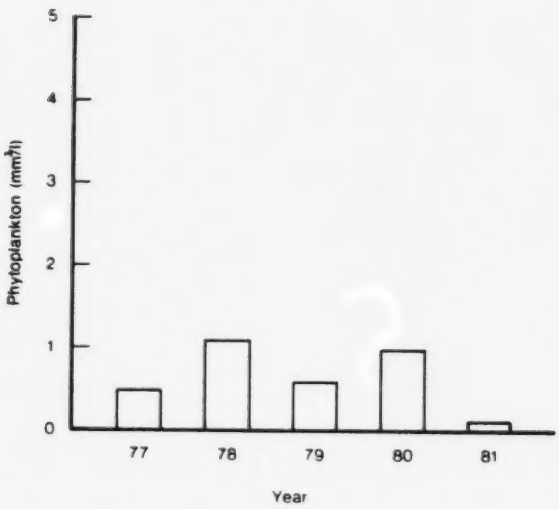
| Year | | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|---|
| 1977 | T | 119.2 | -- | 0.033 | -- | -- | -- |
| | B | 139.7 | | 0.575 | | | |
| 1978 | T | 143 | 1.1 | 0.07 | 37.0 | 2.7 | 14.1 |
| | B | 142 | 3.0 | 0.18 | 38.2 | 2.7 | 13.9 |
| 1979 | T | 126 | -- | 0.03 | 35.1 | 2.8 | 14.5 |
| | B | 147 | | 0.62 | 40.5 | 2.8 | 14.5 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 11. CYPRUS LAKE




**Chlorophyll a–Secchi disc curve.**




**Phytoplankton cell volumes.**

Average values for water quality parameters

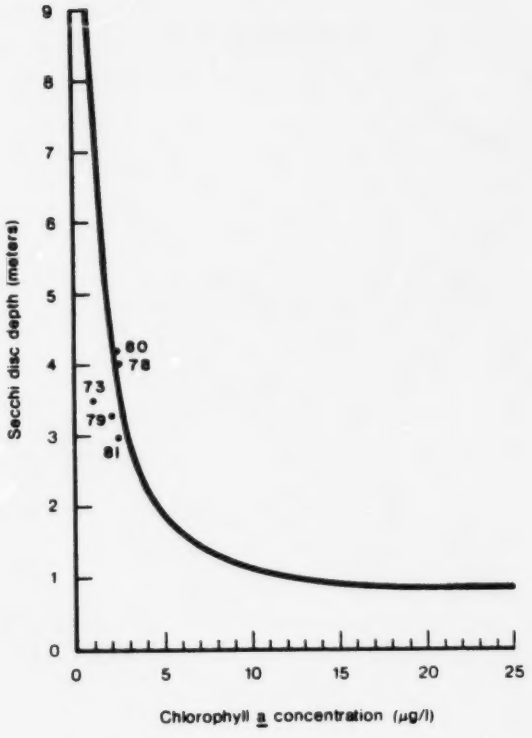
| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 T | 2.8 | -- | 0.550 | 0.008 | 0.002 | 2.0 | 173.3 |
| B | | | | 0.018 | 0.002 | 2.13 | 172.0 |
| 1978 T | 2.9 | 2.1 | 1.207 | 0.005 | 0.002 | 2.1 | 174 |
| B | | | | 0.006 | 0.002 | 2.2 | 183 |
| 1979 T | 2.0 | 1.6 | 0.667 | 0.006 | 0.002 | 2.2 | 182 |
| B | | | | 0.011 | 0.002 | 2.2 | 183 |

| Year | Nitrogens Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids Total | Solids Suspended |
|---|---|---|---|---|---|---|---|
| 1977 T | 0.02 | 0.423 | 0.002 | 0.045 | 8.32 | -- | -- |
| B | 0.024 | 0.543 | 0.002 | 0.045 | 8.29 | | |
| 1978 T | 0.015 | 0.319 | 0.003 | 0.04 | 8.27 | 219 | 4.6 |
| B | 0.015 | 0.335 | 0.002 | 0.04 | 8.60 | | |
| 1979 T | 0.024 | 0.34 | 0.002 | 0.01 | 8.47 | 196 | 5.0 |
| B | 0.039 | 0.36 | 0.001 | 0.02 | 8.35 | 191 | 5.0 |

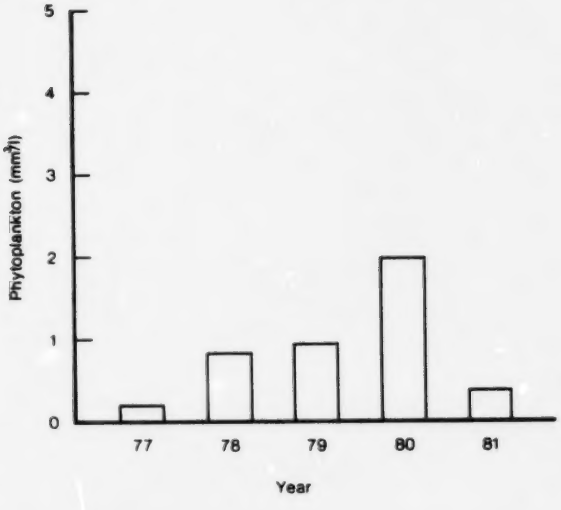
| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 T | 154.3 | -- | 0.04 | -- | -- | -- |
| B | 159 | | 0.10 | | | |
| 1978 T | 163 | 2.13 | 0.03 | 39.5 | 0.4 | 19.2 |
| B | 162 | 2.13 | 0.03 | 39.8 | 0.5 | 18.4 |
| 1979 T | 161 | -- | 0.04 | 38.1 | 0.8 | 21.1 |
| B | 163 | | 0.05 | 38.4 | 0.7 | 21.1 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 12. EUGENIA LAKE




**Chlorophyll a–Secchi disc curve.**




**Phytoplankton cell volumes.**

Average values for water quality parameters

| Year | | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 3.9 | -- | 0.227 | 0.009 | 0.003 | 3.5 | 212 |
| | B | | | | 0.014 | 0.005 | 3.5 | 200 |
| 1978 | T | 4.0 | 2.6 | 0.827 | 0.01 | 0.002 | 3.9 | 210 |
| | B | | | | 0.015 | 0.002 | 3.7 | 212 |
| 1979 | T | 3.4 | 2.3 | 0.934 | 0.008 | 0.001 | 3.9 | 198 |
| | B | | | | 0.026 | 0.004 | 3.9 | 231 |

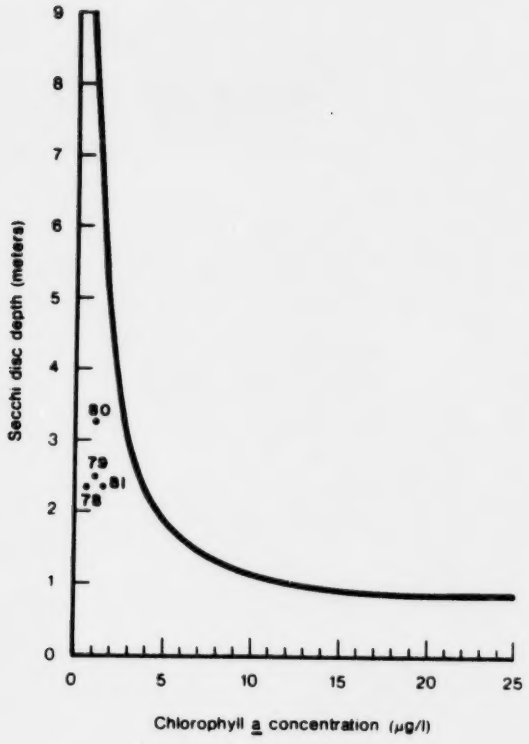
| Year | | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 0.005 | 0.300 | 0.007 | 0.84 | 8.36 | -- | -- |
| | B | 0.025 | 0.455 | 0.005 | 0.86 | 8.21 | | |
| 1978 | T | 0.028 | 0.391 | 0.005 | 0.4 | 8.53 | 223 | 2.0 |
| | B | 0.032 | 0.429 | 0.005 | 0.4 | 8.49 | | |
| 1979 | T | 0.033 | 0.37 | 0.003 | 0.21 | 8.37 | 224 | < 5.0 |
| | B | 0.577 | 1.02 | 0.005 | 0.20 | 7.74 | 270 | 6.0 |

| Year | | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|---|
| 1977 | T | 187 | -- | 0.04 | -- | -- | -- |
| | B | 186 | | 0.08 | | | |
| 1978 | T | 195 | 0.76 | 0.062 | 49.8 | 1.9 | 20.6 |
| | B | 196 | 1.32 | 0.122 | 50.0 | 1.8 | 20.6 |
| 1979 | T | 185 | -- | 0.12 | 40.4 | 2.3 | 23.6 |
| | B | 227 | | 0.53 | 52.8 | 2.4 | 24.2 |

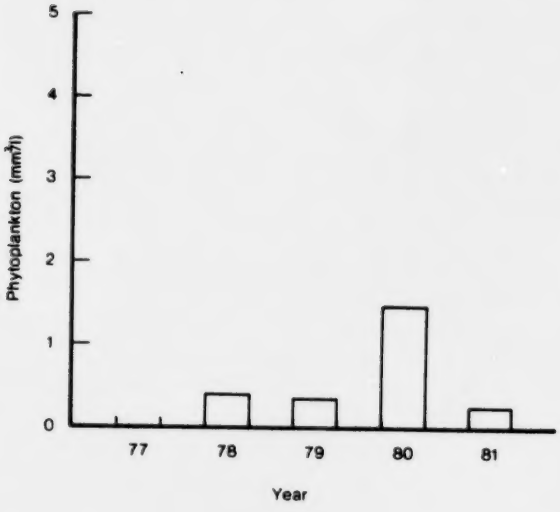
*Note - All values in mg/l except where otherwise indicated

**Formazin Turbidity Units

## 13. FRANCIS LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume ($mm^3/l$) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 | -- | -- | -- | -- | -- | -- | -- |
| 1978 | 2.9 | 0.95 | 0.458 | 0.008 | 0.002 | 2.0 | 184 |
| 1979 | 2.6 | 1.2 | 0.427 | 0.010 | 0.001 | 2.3 | 164 |

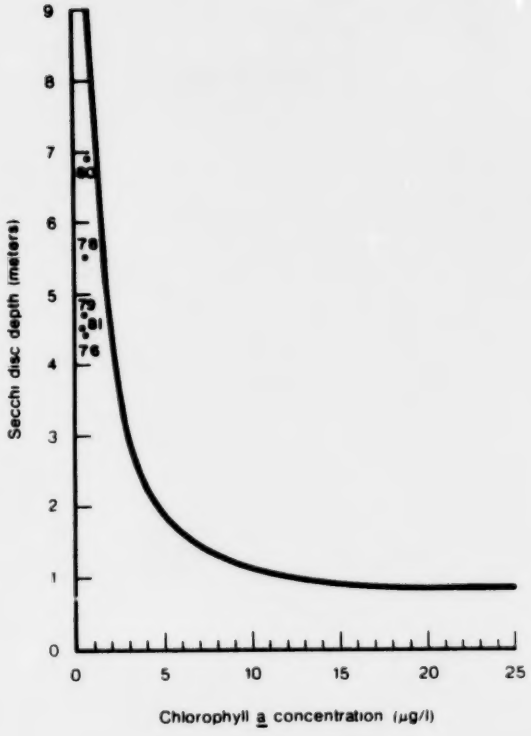
| Year | Nitrogens: Free ammonia | Nitrogens: Kjeldahl | Nitrogens: Nitrite | Nitrogens: Nitrate | pH (no units) | Solids: Total | Solids: Suspended |
|---|---|---|---|---|---|---|---|
| 1977 | -- | -- | -- | -- | -- | -- | -- |
| 1978 | 0.028 | 0.358 | 0.005 | 0.362 | 8.45 | 216 | 3.5 |
| 1979 | 0.031 | 0.38 | 0.001 | 0.03 | 8.62 | 205 | <5.0 |

| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 | -- | -- | -- | -- | -- | -- |
| 1978 | 184 | 0.75 | 0.025 | 42.5 | 0.9 | 21.6 |
| 1979 | 143 | -- | 0.07 | 25.1 | 1.0 | 22.6 |

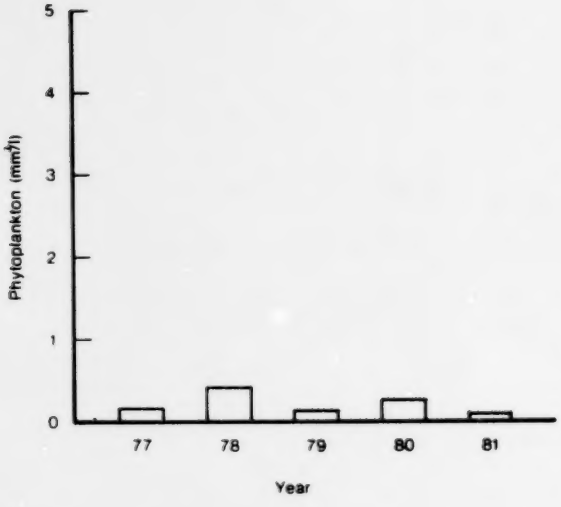
*Note - All values in mg/l except where otherwise indicated

**Formazin Turbidity Units

## 14. GILLIES LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

| Year | | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume ($mm^3/l$) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 7.5 | -- | 0.216 | 0.015 | -- | 1.0 | 169 |
| | B | | | | 0.007 | -- | 1.0 | 168 |
| 1978 | T | 5.6 | 0.9 | 0.465 | 0.004 | 0.001 | 0.7 | 162 |
| | B | | | | 0.009 | 0.001 | 0.7 | 176 |
| 1979 | T | 4.6 | 1.0 | 0.202 | 0.004 | 0.002 | 0.7 | 166 |
| | B | | | | 0.008 | 0.002 | 0.8 | 179 |

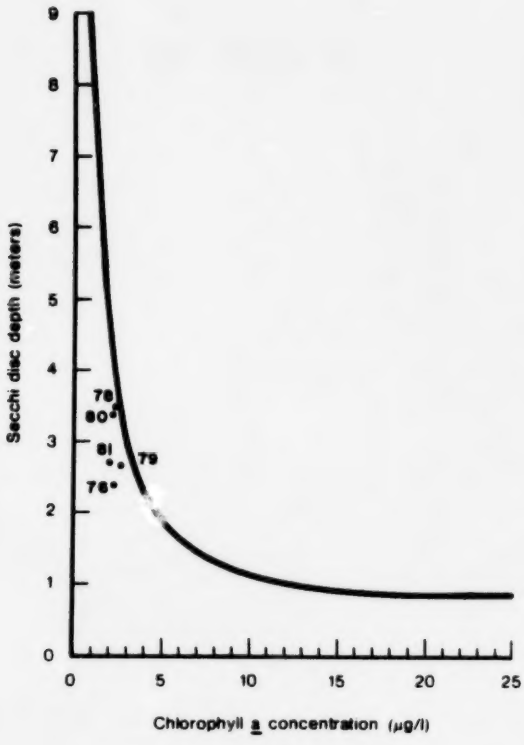
| Year | | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Solids: Suspended |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 0.015 | 0.845 | 0.004 | 0.345 | 8.47 | -- | -- |
| | B | 0.03 | 0.39 | 0.007 | 0.06 | 7.91 | | |
| 1978 | T | 0.03 | 0.320 | 0.002 | 0.04 | -- | 204 | 2.5 |
| | B | 0.05 | 0.363 | 0.004 | 0.08 | | 196 | 2.3 |
| 1979 | T | 0.011 | 0.33 | 0.002 | 0.02 | 8.52 | 176 | 5.0 |
| | B | 0.030 | 0.30 | 0.003 | 0.12 | 7.81 | 181 | <5.0 |

| Year | | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|---|
| 1977 | T | 150.5 | -- | 0.03 | -- | -- | -- |
| | B | 156.0 | | 0.04 | | | |
| 1978 | T | -- | 0.55 | 0.02 | 32.5 | 0.4 | 19.4 |
| | B | | 0.55 | 0.04 | 36.3 | 0.5 | 20.7 |
| 1979 | T | 150 | -- | 0.03 | 30.9 | 0.5 | 21.6 |
| | B | 160 | | 0.07 | 36.3 | 0.6 | 21.5 |

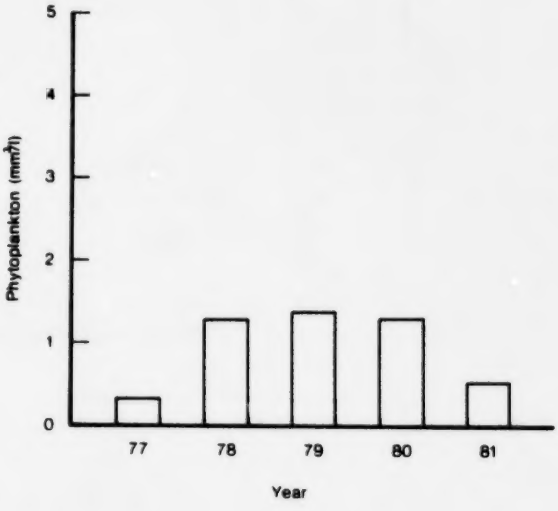
*Note - All values in mg/l except where otherwise indicated

**Formazin Turbidity Units

## 15. GOULD LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

| Year | | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 3.0 | — | 0.391 | 0.012 | 0.002 | 5.47 | 152 |
| | B | | | | 0.014 | 0.002 | 5.43 | 154.5 |
| 1978 | T | 3.3 | 2.2 | 1.368 | 0.014 | 0.001 | 4.8 | 134.5 |
| | B | | | | 0.021 | 0.002 | 5.0 | 137.7 |
| 1979 | T | 2.7 | 2.8 | 1.405 | 0.012 | 0.003 | 4.8 | 149 |
| | B | | | | 0.010 | 0.001 | 4.8 | 157 |

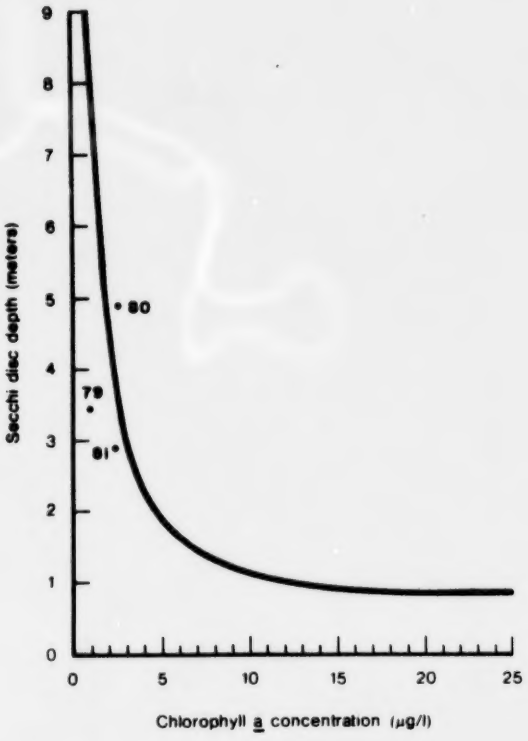
| Year | | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 0.030 | 0.569 | 0.001 | 0.021 | 8.42 | -- | -- |
| | B | 0.060 | 0.621 | 0.001 | 0.021 | 8.21 | | |
| 1978 | T | 0.030 | 0.468 | 0.002 | 0.04 | -- | 164 | 2.5 |
| | B | 0.125 | 0.627 | 0.004 | 0.03 | | 169 | 1.5 |
| 1979 | T | 0.037 | 0.51 | 0.001 | 0.01 | 8.42 | 177 | 4.7 |
| | B | 0.078 | 0.51 | 0.001 | 0.01 | 8.10 | 179 | 4.6 |

| Year | | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|---|
| 1977 | T | 133.7 | -- | 0.035 | -- | -- | -- |
| | B | 138.5 | | 0.035 | | | |
| 1978 | T | -- | 1.0 | 0.19 | 36.0 | 2.1 | 16.5 |
| | B | | 1.2 | 0.09 | 38.7 | 2.4 | 16.4 |
| 1979 | T | 133 | -- | 0.04 | 32.1 | 2.2 | 16.9 |
| | B | 140 | | 0.06 | 34.9 | 2.1 | 17.1 |

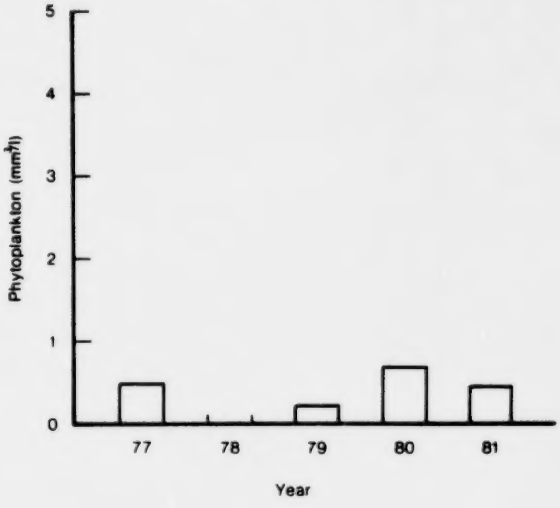
*Note - All values in mg/l except where otherwise indicated

**Formazin Turbidity Units

## 16. IRISH LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

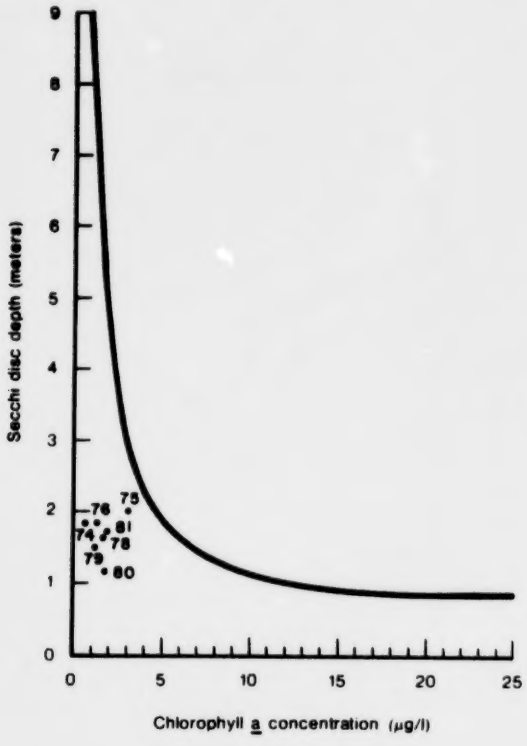
| Year | | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 4.6 | -- | 0.631 | 0.013 | 0.003 | 1.0 | 92 |
| | B | | | | 0.013 | 0.004 | 1.0 | 100 |
| 1978 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1979 | T | 3.4 | 1.6 | 0.381 | 0.013 | 0.003 | 1.2 | 95 |
| | B | | | | 0.014 | 0.001 | 1.1 | 93 |

| Year | | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Solids: Suspended |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 0.315 | 0.905 | 0.005 | 0.08 | 8.13 | -- | -- |
| | B | 0.340 | 0.785 | 0.006 | 0.08 | 7.94 | | |
| 1978 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1979 | T | 0.024 | 0.45 | 0.001 | 0.02 | 8.58 | 112 | <5.0 |
| | B | 0.033 | 0.50 | 0.001 | 0.01 | 8.59 | 114 | <5.0 |

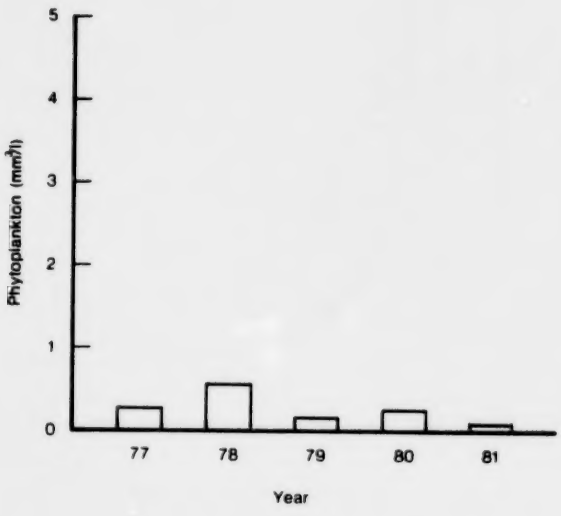
| Year | | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|---|
| 1977 | T | 87.4 | -- | 0.08 | | | |
| | B | 86.2 | | 0.30 | | | |
| 1978 | T | -- | -- | -- | -- | -- | -- |
| | B | | | | | | |
| 1979 | T | 85.5 | -- | 0.05 | 21.8 | 0.73 | 9.8 |
| | B | 85.9 | | 0.07 | 21.4 | 0.47 | 9.6 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 17. ISAAC LAKE




**Chlorophyll a–Secchi disc curve.**




**Phytoplankton cell volumes.**

Average values for water quality parameters

| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume ($mm^3/l$) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 | 1.5 | -- | 0.309 | 0.021 | 0.006 | 3.0 | 152 |
| 1978 | 1.7 | 1.7 | 0.574 | 0.01 | 0.001 | 2.9 | 161 |
| 1979 | 1.5 | 1.4 | 0.230 | 0.012 | 0.001 | 3.0 | 170 |

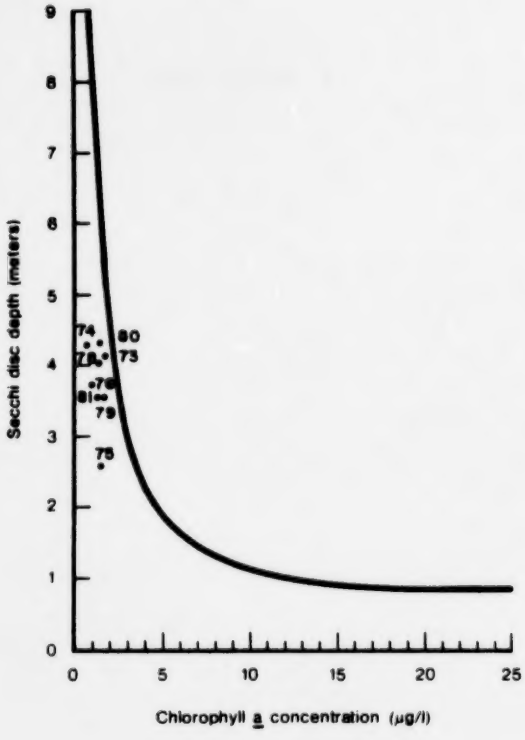
| Year | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|
| 1977 | 0.045 | 0.495 | 0.005 | < 0.01 | 8.09 | -- | -- |
| 1978 | 0.031 | 0.525 | 0.002 | 0.01 | 8.36 | 186 | 2.5 |
| 1979 | 0.020 | 0.530 | 0.001 | 0.01 | 8.34 | 189 | 5.0 |

| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 | 129 | -- | 0.06 | -- | -- | -- |
| 1978 | 151 | 1.04 | 0.05 | 38.2 | 1.1 | 15.8 |
| 1979 | 154 | -- | 0.08 | 36.9 | 1.5 | 18.9 |

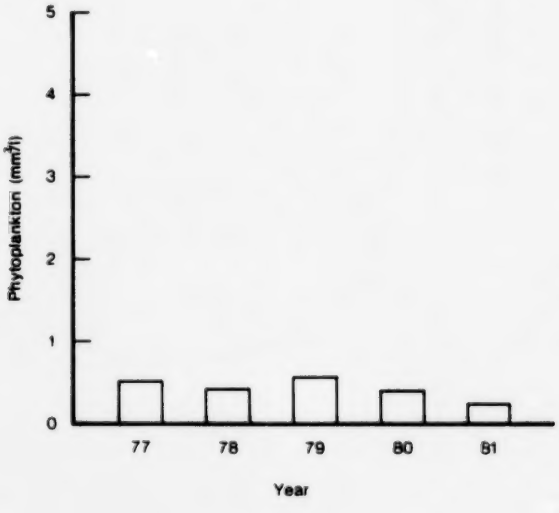
*Note - All values in mg/l except where otherwise indicated

**Formazin Turbidity Units

## 18. McCULLOUGH LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

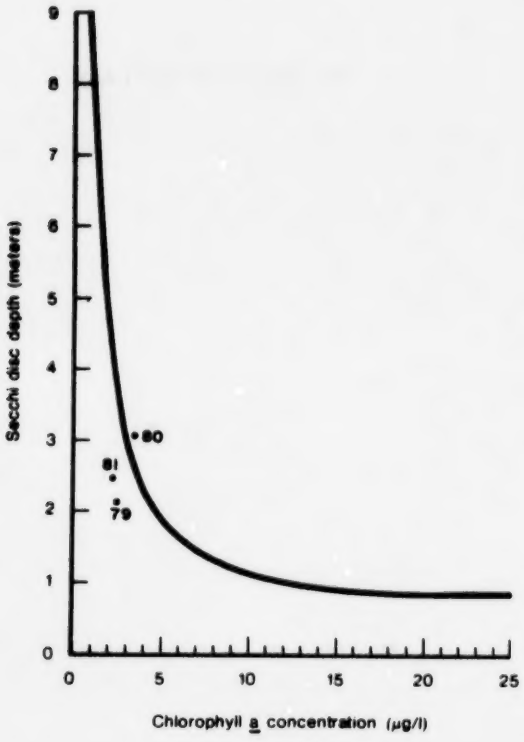
| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume ($mm^3/l$) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 T | 3.7 | — | 0.501 | 0.008 | 0.001 | 3.6 | 231.3 |
| B | | | | 0.016 | 0.002 | 3.9 | 221.3 |
| 1978 T | 4.0 | 1.3 | 0.487 | 0.006 | 0.001 | 3.4 | 231 |
| B | | | | 0.009 | 0.002 | 3.9 | 235 |
| 1979 T | 3.6 | 1.8 | 0.542 | 0.005 | 0.002 | 3.6 | 238 |
| B | | | | 0.008 | 0.003 | 3.6 | 231 |

| Year | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|
| 1977 T | 0.019 | 0.318 | 0.004 | 0.40 | 8.38 | -- | -- |
| B | 0.028 | 0.352 | 0.035 | 0.55 | 7.83 | | |
| 1978 T | 0.021 | 0.279 | 0.004 | 0.47 | 8.33 | 260 | 0.7 |
| B | 0.021 | 0.294 | 0.004 | 0.68 | 8.41 | | |
| 1979 T | 0.016 | 0.26 | 0.003 | 0.53 | 8.38 | 249 | 4.5 |
| B | 0.020 | 0.26 | 0.009 | 0.63 | 7.72 | 254 | 4.7 |

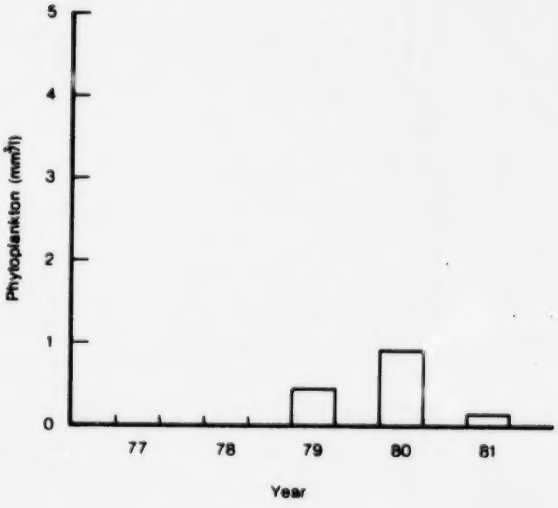
| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 T | 218.3 | -- | 0.038 | -- | -- | -- |
| B | 210.8 | | 0.080 | | | |
| 1978 T | 215 | 1.18 | 0.056 | 52.7 | 1.93 | 24.1 |
| B | 215 | 1.67 | 0.09 | 55.0 | 2.03 | 23.8 |
| 1979 T | 224 | -- | 0.04 | 53.4 | 2.0 | 25.4 |
| B | 214 | | 0.13 | 54.2 | 2.0 | 23.1 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 19. McGILL LAKE




**Chlorophyll a–Secchi disc curve.**




**Phytoplankton cell volumes.**

Average values for water quality parameters

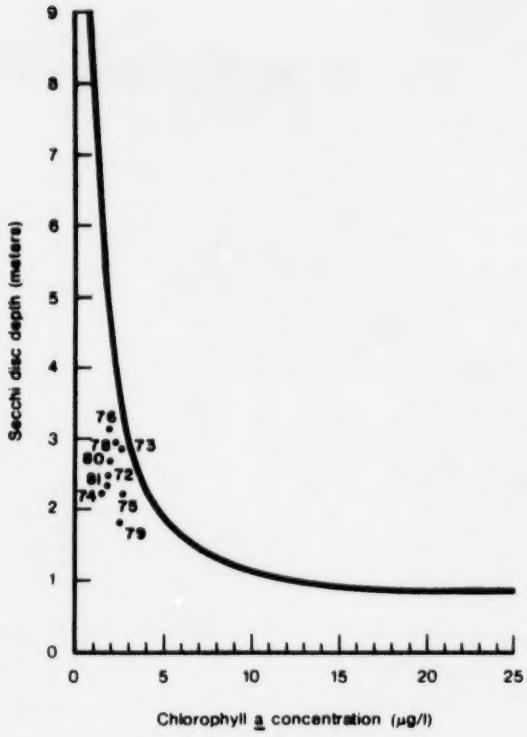
| Year | | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1978 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1979 | T | 2.1 | 2.7 | .378 | 0.014 | L0.001 | 1.5 | 199 |
| | B | | | | 0.029 | 0.005 | 2.0 | 196 |

| Year | | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Solids: Suspended |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1978 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1979 | T | 0.013 | 0.39 | L0.001 | L0.01 | 8.34 | 236 | L5.0 |
| | B | 0.052 | 0.50 | 0.001 | L0.01 | 7.76 | 227 | L5.0 |

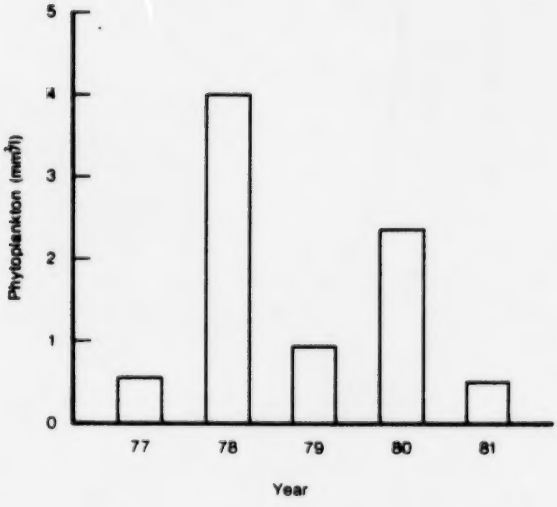
| Year | | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|---|
| 1977 | T | -- | -- | -- | -- | -- | -- |
| | B | | | | | | |
| 1978 | T | -- | -- | -- | -- | -- | -- |
| | B | | | | | | |
| 1979 | T | 188 | -- | 0.04 | 47.5 | 1.1 | 19.7 |
| | B | 184 | | 0.08 | 47.2 | 1.4 | 18.9 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 20. MILLER LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

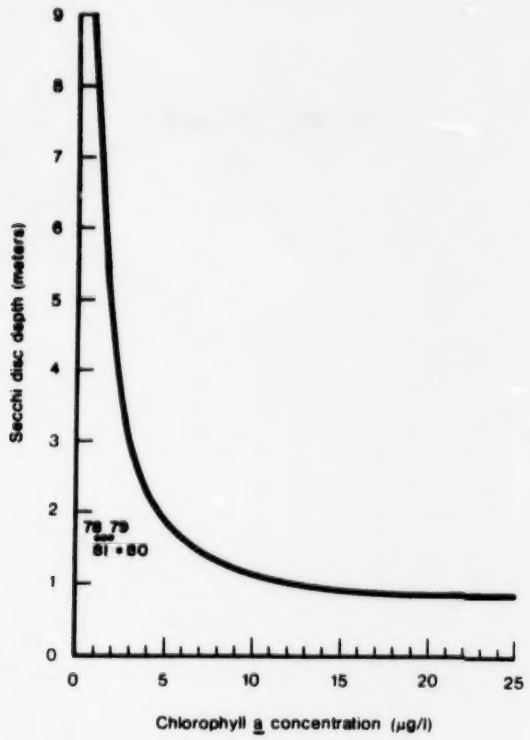
| Year | | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 2.6 | -- | 0.592 | 0.010 | 0.003 | 1.28 | 155 |
| | B | | | | 0.013 | 0.002 | 1.28 | 155 |
| 1978 | T | 2.9 | 2.3 | 4.153 | 0.006 | 0.001 | 1.6 | 192 |
| | B | | | | 0.010 | 0.001 | 1.7 | 209 |
| 1979 | T | 1.8 | 2.5 | 1.066 | 0.010 | 0.002 | 1.4 | 165 |
| | B | | | | 0.008 | 0.001 | 1.5 | 167 |

| Year | | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 0.023 | 0.481 | 0.001 | 0.022 | 8.43 | -- | -- |
| | B | 0.035 | 0.530 | 0.001 | 0.019 | 8.43 | | |
| 1978 | T | 0.024 | 0.400 | 0.003 | 0.06 | 8.60 | 178 | 1.8 |
| | B | 0.028 | 0.432 | 0.003 | 0.08 | 8.58 | | |
| 1979 | T | 0.024 | 0.50 | 0.001 | 0.01 | 8.40 | 178 | < 5.0 |
| | B | 0.021 | 0.42 | 0.001 | 0.01 | 8.41 | 180 | < 5.0 |

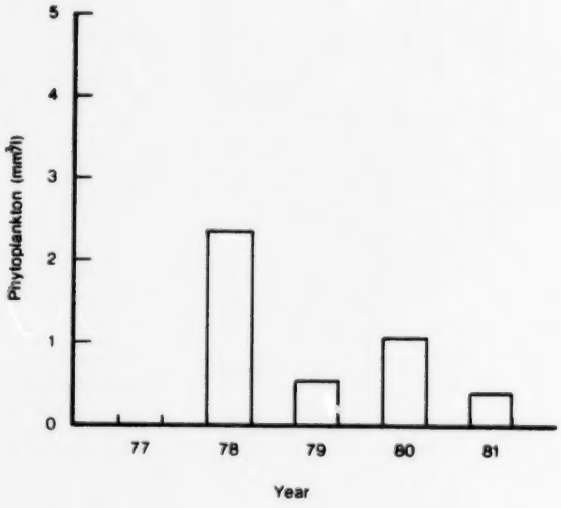
| Year | | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|---|
| 1977 | T | 140 | -- | 0.038 | -- | -- | -- |
| | B | 141 | | 0.054 | | | |
| 1978 | T | 149 | 1.20 | 0.04 | 90.6 | 8.4 | 36.9 |
| | B | 148 | 0.94 | 0.05 | 103.0 | 9.9 | 42.0 |
| 1979 | T | 150 | -- | 0.03 | 34.8 | 0.6 | 19.0 |
| | B | 151 | | 0.13 | 35.1 | 0.6 | 19.2 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 21. MOUNTAIN LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume ($mm^3/l$) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 | -- | -- | -- | -- | -- | -- | -- |
| 1978 | 1.7 | 1.4 | 2.471 | 0.010 | 0.002 | 2.2 | 168 |
| 1979 | 1.7 | 1.9 | 0.567 | 0.018 | < 0.001 | 2.3 | 158 |

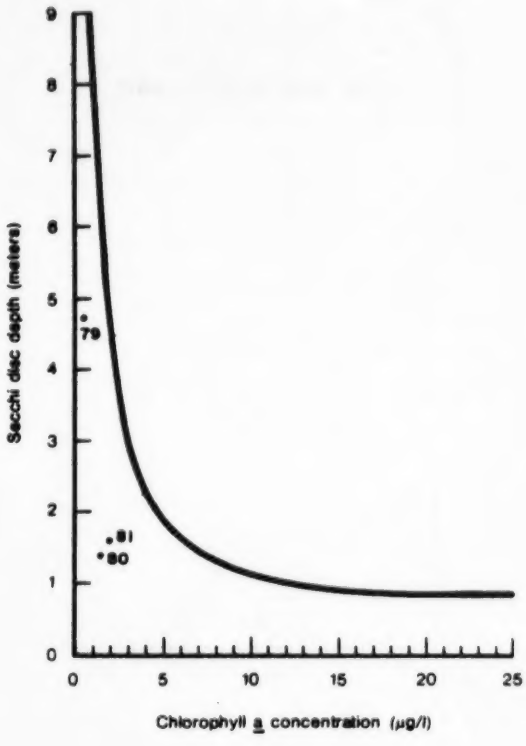
| Year | Nitrogens: Free ammonia | Nitrogens: Kjeldahl | Nitrogens: Nitrite | Nitrogens: Nitrate | pH (no units) | Solids: Total | Solids: Suspended |
|---|---|---|---|---|---|---|---|
| 1977 | -- | -- | -- | -- | -- | -- | -- |
| 1978 | 0.038 | 0.574 | 0.003 | 0.04 | 8.41 | 177 | .4.2 |
| 1979 | 0.036 | 0.69 | 0.001 | 0.01 | 8.69 | 177 | < 5.0 |

| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 | -- | -- | -- | -- | -- | -- |
| 1978 | 156 | 1.14 | 0.04 | 39.5 | 0.95 | 16.8 |
| 1979 | 137 | -- | 0.06 | 27.8 | 1.4 | 21.5 |

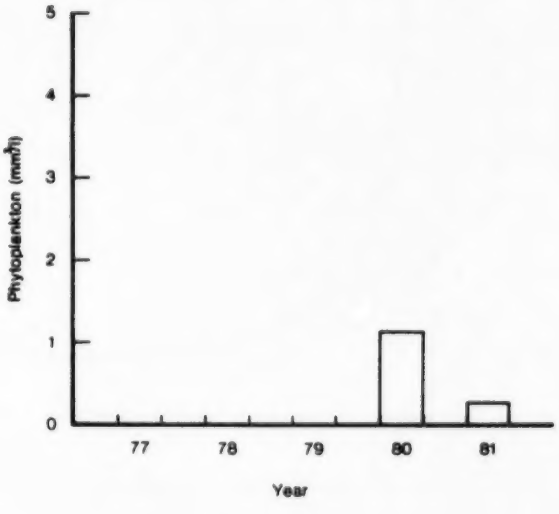
*Note - All values in mg/l except where otherwise indicated

**Formazin Turbidity Units

## 22. SHEPHARD LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

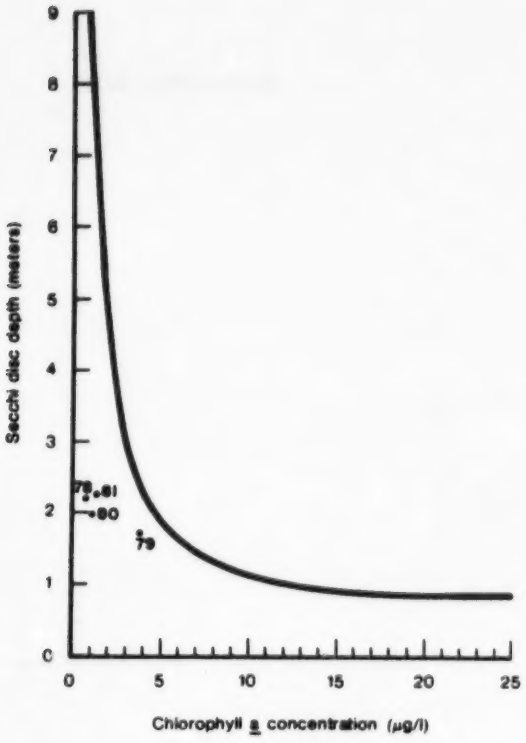
| Year | | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1978 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1979 | T | 4.8 | 0.7 | -- | 0.007 | L0.001 | 1.5 | 213 |
| | B | | | | 0.005 | L0.001 | 1.5 | 200 |

| Year | | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1978 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1979 | T | 0.063 | 0.43 | 0.002 | 0.25 | 8.15 | 245 | L5.0 |
| | B | 0.090 | 0.58 | 0.002 | 0.11 | 8.26 | 246 | L5.0 |

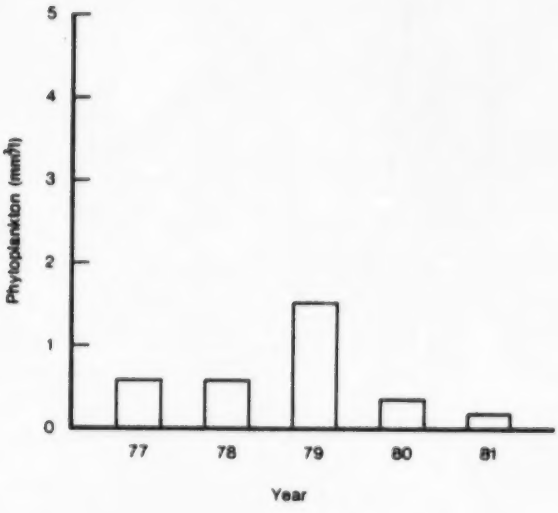
| Year | | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|---|
| 1977 | T | -- | -- | -- | -- | -- | -- |
| | B | | | | | | |
| 1978 | T | -- | -- | -- | -- | -- | -- |
| | B | | | | | | |
| 1979 | T | 195 | -- | 0.02 | 42.8 | 1.3 | 25.7 |
| | B | 181 | | 0.06 | 35.0 | 1.2 | 27.2 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 23. SHOULDICE LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

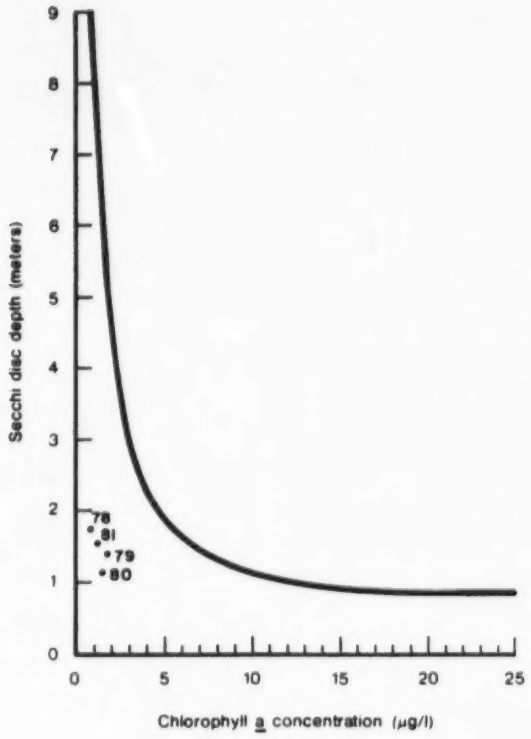
| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume ($mm^3/l$) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 | 4.0 | -- | 0.681 | 0.013 | 0.003 | 1.0 | 142 |
| 1978 | 2.2 | 0.9 | 0.681 | 0.008 | 0.002 | 0.7 | 160 |
| 1979 | 1.7 | 4.1 | 1.687 | 0.008 | 0.002 | 1.0 | 152 |

| Year | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|
| 1977 | 0.018 | 0.583 | 0.002 | 0.01 | 8.7 | -- | -- |
| 1978 | 0.055 | 0.490 | 0.002 | 0.02 | -- | 192 | 28.5 |
| 1979 | 0.022 | 0.560 | 0.001 | 0.01 | 8.53 | 170 | < 5.0 |

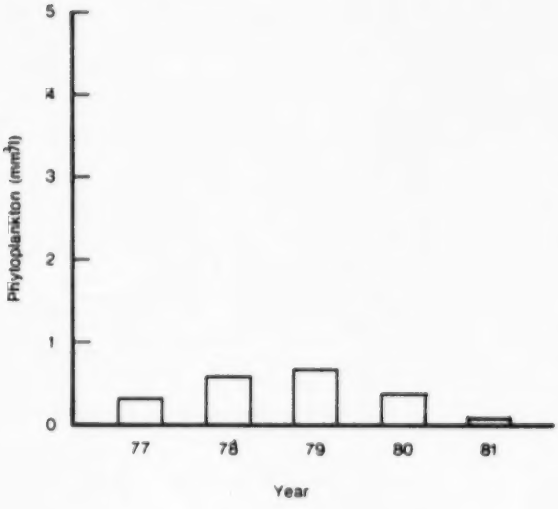
| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 | 130.5 | -- | 0.025 | -- | -- | -- |
| 1978 | -- | 0.85 | 0.02 | 31.0 | 0.4 | 19.7 |
| 1979 | 138 | -- | 0.06 | 24.1 | 0.5 | 22.3 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 24. SILVER LAKE




**Chlorophyll a–Secchi disc curve.**




**Phytoplankton cell volumes.**

Average values for water quality parameters

| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 | -- | -- | 0.265 | 0.016 | < 0.001 | 2.0 | -- |
| 1978 | 1.7 | 1.2 | 0.632 | 0.014 | 0.002 | 2.0 | 164 |
| 1979 | 1.5 | 1.9 | 0.725 | 0.013 | 0.001 | 2.4 | 168 |

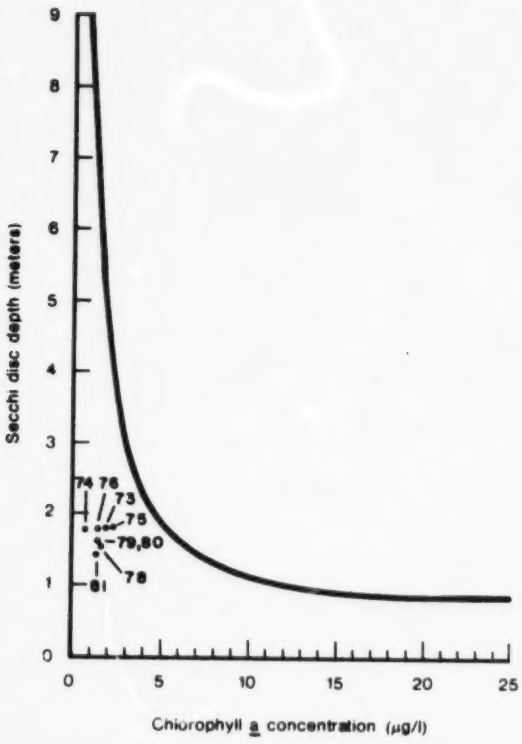
| Year | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|
| 1977 | 0.025 | 0.585 | 0.001 | < 0.01 | -- | -- | -- |
| 1978 | 0.04 | 0.554 | 0.002 | < 0.01 | 8.36 | 194 | 2.0 |
| 1979 | 0.041 | 0.620 | 0.001 | 0.01 | 8.38 | 191 | 5.5 |

| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 | 135 | -- | 0.09 | -- | -- | -- |
| 1978 | 164 | 1.19 | 0.13 | 41.3 | 0.8 | 15.0 |
| 1979 | 142 | -- | 0.08 | 38.0 | 1.1 | 17.7 |

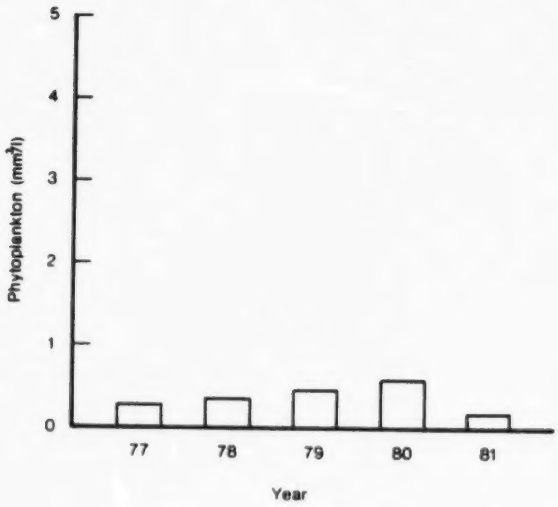
*Note - All values in mg/l except where otherwise indicated

**Formazin Turbidity Units

## 25. SKY LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

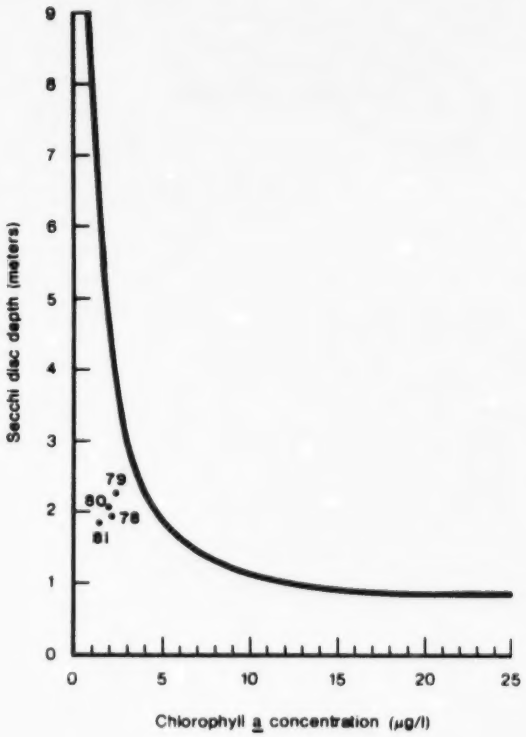
| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume ($mm^3/l$) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 | 0.9 | -- | 0.285 | 0.014 | 0.002 | 2.6 | 162 |
| 1978 | 1.7 | 1.9 | 0.459 | 0.016 | 0.006 | 2.3 | 163 |
| 1979 | 1.7 | 1.8 | 0.519 | 0.024 | 0.001 | 2.8 | 169 |

| Year | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|
| 1977 | 0.025 | 0.625 | 0.001 | 0.01 | 8.47 | -- | -- |
| 1978 | 0.024 | 0.495 | 0.002 | 0.01 | 8.38 | 186 | 1.5 |
| 1979 | 0.016 | 0.59 | 0.001 | 0.01 | 8.54 | 213 | 5.0 |

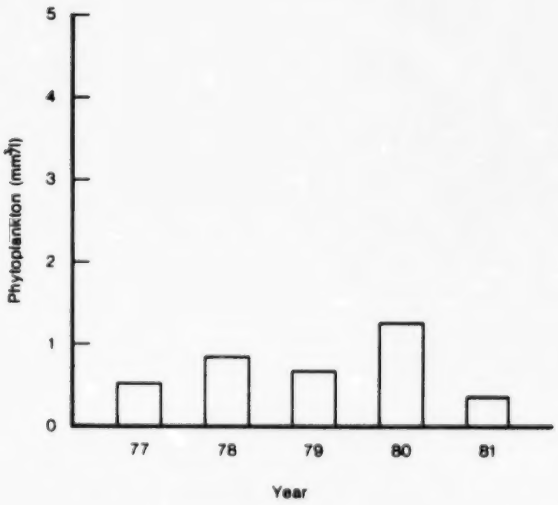
| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 | 147.9 | -- | 0.067 | -- | -- | -- |
| 1978 | 156 | 1.31 | 0.07 | 37.7 | 1.1 | 16.8 |
| 1979 | 158 | -- | 0.07 | 33.4 | 1.8 | 20.8 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 26. SPRY LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

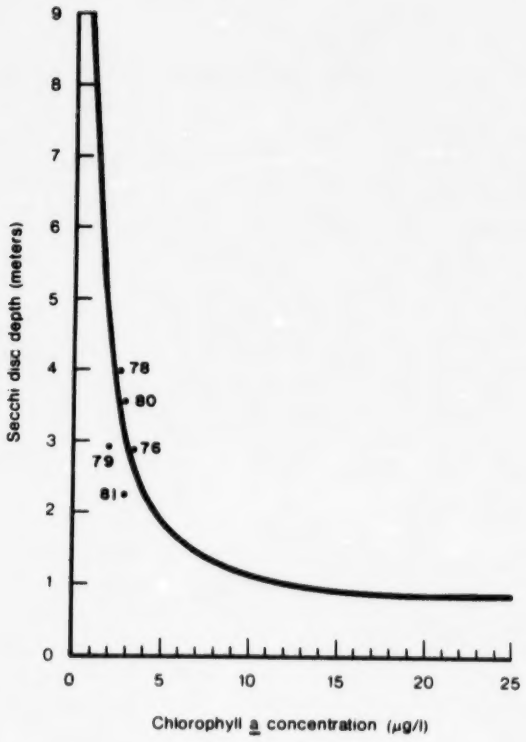
| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume ($mm^3/l$) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 | 1.2 | -- | 0.620 | 0.014 | 0.003 | 4.73 | 110 |
| 1978 | 1.8 | 1.45 | 0.939 | 0.011 | 0.001 | 4.7 | 106 |
| 1979 | 2.4 | 2.5 | 0.695 | 0.009 | 0.001 | 5.1 | 120 |

| Year | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|
| 1977 | 0.086 | 0.76 | 0.002 | 0.02 | 8.45 | -- | -- |
| 1978 | 0.139 | 0.79 | 0.003 | 0.04 | 9.0 | 134 | 2 |
| 1979 | 0.034 | 0.61 | 0.001 | 0.01 | 8.50 | 145 | < 5.0 |

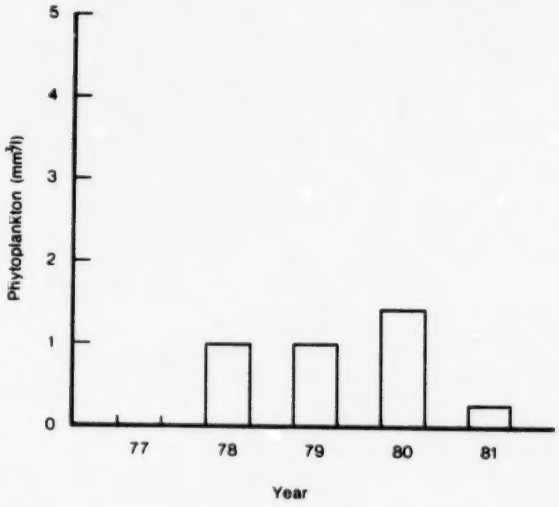
| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 | 99 | -- | 0.05 | -- | -- | -- |
| 1978 | 88 | 1.27 | 0.07 | 29.8 | 2.2 | 8.8 |
| 1979 | 100 | -- | 0.08 | 30.6 | 2.7 | 10.6 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 27. WILCOX LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

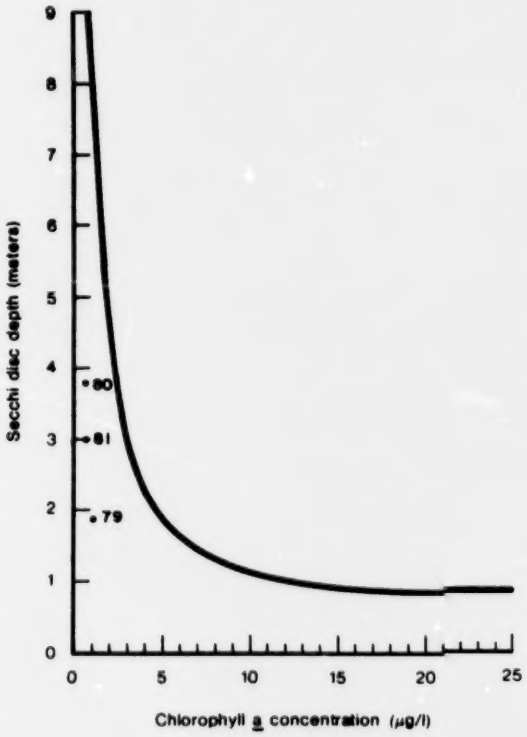
| Year | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 1977 T | 3.6 | -- | -- | 0.017 | 0.005 | 8.0 | 180 |
| B | | | | 0.018 | 0.005 | 6.0 | 184 |
| 1978 T | 4.0 | 2.9 | 1.073 | 0.012 | 0.002 | 4.9 | 183 |
| B | | | | 0.015 | 0.002 | 4.9 | 180 |
| 1979 T | 2.9 | 2.3 | 1.120 | 0.011 | 0.001 | 4.8 | 205 |
| B | | | | 0.016 | 0.002 | 4.9 | 211 |

| Year | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|
| 1977 T | 0.025 | 0.365 | 0.005 | 0.10 | 8.17 | -- | -- |
| B | 0.025 | 0.425 | 0.007 | 0.12 | 8.16 | | |
| 1978 T | 0.018 | 0.40 | 0.001 | 0.01 | 8.48 | | |
| B | 0.018 | 0.426 | 0.002 | 0.01 | 8.49 | -- | -- |
| 1979 T | 0.023 | 0.37 | 0.001 | 0.01 | 8.48 | 219 | <5.0 |
| B | 0.021 | 0.42 | 0.001 | 0.01 | 8.45 | 218 | <5.0 |

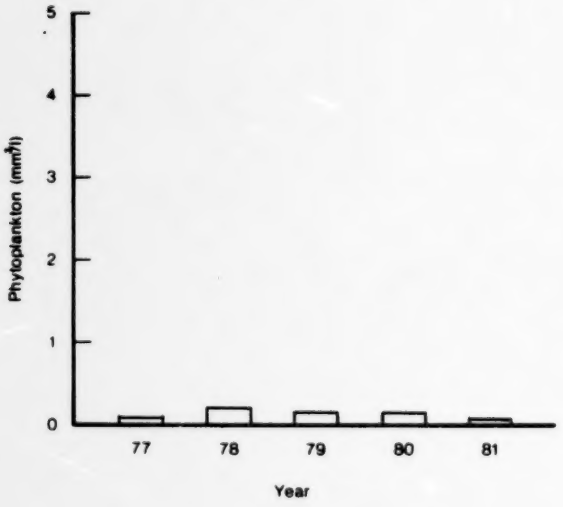
| Year | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|
| 1977 T | 166 | -- | 0.08 | -- | -- | -- |
| B | 170 | | 0.06 | | | |
| 1978 T | 180 | 0.92 | 0.04 | 40.5 | -- | 19.8 |
| B | 180 | 1.10 | 0.04 | 40.5 | | 19.2 |
| 1979 T | 181 | -- | 0.05 | 45.3 | 3.1 | 20.4 |
| B | 181 | | 0.09 | 44.3 | 3.3 | 21.2 |

*Note - All values in mg/l except where otherwise indicated
**Formazin Turbidity Units

## 28. WILLIAMS LAKE




Chlorophyll a–Secchi disc curve.




Phytoplankton cell volumes.

Average values for water quality parameters

| Year | | Secchi disc (m) | Chlorophyll a (ug/l) | Phytoplankton volume (mm³/l) | Phosphorus Total | Phosphorus Soluble | Chloride as Cl | Hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 2.1 | -- | 0.075 | 0.006 | 0.001 | 14 | 216 |
| | B | | | | 0.016 | 0.002 | 14 | 214 |
| 1978 | T | -- | -- | 0.226 | -- | -- | -- | -- |
| | B | | | | | | | |
| 1979 | T | 1.9 | 1.1 | 0.140 | 0.004 | 0.001 | 12.8 | 208 |
| | B | | | | 0.007 | 0.001 | 12.8 | 212 |

| Year | | Nitrogens: Free ammonia | Kjeldahl | Nitrite | Nitrate | pH (no units) | Solids: Total | Suspended |
|---|---|---|---|---|---|---|---|---|
| 1977 | T | 0.075 | 0.42 | 0.007 | 0.31 | 8.28 | -- | -- |
| | B | 0.07 | 0.46 | 0.006 | 0.31 | 8.22 | | |
| 1978 | T | -- | -- | -- | -- | -- | -- | -- |
| | B | | | | | | | |
| 1979 | T | 0.048 | 0.32 | 0.003 | 0.17 | 8.31 | 253 | < 5.0 |
| | B | 0.050 | 0.34 | 0.003 | 0.16 | 8.34 | 246 | < 5.0 |

| Year | | Alkalinity as $CaCO_3$ | Turbidity FTU** | Iron | Calcium | Sodium | Magnesium |
|---|---|---|---|---|---|---|---|
| 1977 | T | 200 | -- | 0.033 | -- | -- | -- |
| | B | 201 | | 0.063 | | | |
| 1978 | T | -- | -- | -- | -- | -- | -- |
| | B | | | | | | |
| 1979 | T | 189 | -- | 0.04 | 44.8 | 7.1 | 23.2 |
| | B | 190 | | 0.05 | 45.3 | 7.4 | 23.9 |

*Note - All values in mg/l except where otherwise indicated

**Formazin Turbidity Units